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**CALIFORNIA
MINERAL PRODUCTION
AND
DIRECTORY OF MINERAL PRODUCERS
FOR 1935**

BULLETIN No. 112

**ISSUED BY THE
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FERRY BUILDING, SAN FRANCISCO**

1937

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STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
GEORGE D. NORDENHOLT, Director

DIVISION OF MINES
FERRY BUILDING, SAN FRANCISCO

WALTER W. BRADLEY

State Mineralogist

San Francisco]

BULLETIN No. 112

[April, 1937

CALIFORNIA
MINERAL PRODUCTION
AND
DIRECTORY OF MINERAL PRODUCERS
FOR 1935

By
HENRY H. SYMONS



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LETTER OF TRANSMITTAL

April, 1937

*To His Excellency, THE HONORABLE FRANK F. MERRIAM,
Governor of the State of California.*

SIR: I have the honor to herewith transmit Bulletin No. 112 of the Division of Mines, of the Department of Natural Resources, being the annual report of the statistics of the mineral production of California.

The remarkable variety, total valuation, and wide distribution of many of our minerals revealed herein show California's importance as a producer of commercial minerals among the states of the Union.

Respectfully submitted.

GEORGE D. NORDENHOLT,
Director, Department of Natural Resources.

INTRODUCTION

It is the endeavor of the staff of the State Division of Mines (formerly State Mining Bureau), in these annual reports of the mineral industries of California, to so compile the statistics of production that they will be of actual use to producers and to those interested in the utilization of the mineral products of our State, while at the same time keeping the individual's data confidential. In addition to the mere figures of output, we have included descriptions of the uses and characteristics of many of the materials, as well as a brief mention of their occurrences.

The compilation of accurate and dependable figures is an extremely difficult undertaking, and the State Mineralogist takes the opportunity of here expressing his appreciation of the cooperation of the producers in making this work possible. A fuller appreciation of the value of early responses to the requests sent out in January will result in earlier completion of the manuscript. Statistics lose much of their value if their publication is unnecessarily delayed.

Some of the data relative to properties and uses of many of the minerals herein described are repeated from preceding reports, as it is intended that this annual statistical bulletin shall be somewhat of a compendium of information on California's commercial minerals and their utilization.

WALTER W. BRADLEY,
State Mineralogist.

MINERAL INDUSTRY, CALIFORNIA, 1935

DATA COMPILED FROM DIRECT RETURNS FROM PRODUCERS IN ANSWER TO INQUIRIES SENT OUT BY THE CALIFORNIA STATE DIVISION OF MINES, FERRY BUILDING, SAN FRANCISCO, CALIFORNIA

CHAPTER ONE

The total value for the mineral output for California for the year 1935 was \$263,404,317, being an increase of \$26,029,608 over the total of 1934 which was \$237,374,709. There were fifty-eight different mineral substances, exclusive of a segregation of the various stones grouped under gems; and all fifty-eight counties of the State contributed to the list.

As revealed by the data following, the salient features of 1935 compared with the previous year, were: The fuels, metals and industrial groups showed a marked increase in total values, while the structural and saline groups registered decreased total values. Petroleum showed the greatest increase in value and output, followed by gold, natural gas, brick and hollow building-tile, lime and limestone, silver, pottery clay, soda, and granite. Those showing decreased values were cement, miscellaneous stone, mineral water, borates and salt.

Of the fuels, petroleum showed an increase in value of \$19,805,640 and an increase in amount from 174,721,282 barrels to 205,979,855 barrels of crude oil. The average received for all gravities of crude oil was less than in 1934. Natural gas showed an increase in both amount and value from 263,207,517 M cu. ft., worth \$14,408,761 in 1934, to 302,447,193 M cu. ft. worth \$17,680,661.

Of the metals, the gold output showed an increase from 719,063.92 fine ounces, to 890,430.00 fine ounces, and an increase in value from \$25,131,284 to \$31,165,050. The gold value for 1935 was \$35 a fine oz. while that in 1934 was calculated on an average weighted value of \$34.95. Silver increased from 844,413 fine ounces worth \$545,883 in 1934, to 1,191,112 fine ounces worth \$856,112; quicksilver from 7,964 flasks valued at \$534,135, to 9,353 flasks worth \$628,590; copper and lead also showed increased values; while tungsten ore and zinc each showed a decrease in amount and value.

Of the structural materials, cement declined from 8,936,085 bbls. valued at \$12,445,616, to 8,086,292 bbls. worth \$10,120,721; miscellaneous stone decreased from a value of \$7,131,330 to \$5,571,041, with marble and sandstone also showing decreased values, while brick and hollow building-tile increased in value from \$1,644,661, to \$1,855,343; granite from \$249,083, to \$339,917; and lime from 32,500 tons valued at \$309,765, to 59,731 tons worth \$573,212; magnesite and slate also showed increased values.

Of the industrial group, increased values were shown by barite, diatomite, pottery clay, gypsum, limestone, pumice and volcanic ash,

silica, talc and soapstone, while the only important materials in this group to show decreased values were mineral water and sulphur. The total value of this group increased from \$4,276,566, to \$4,618,588.

Of the salines, increased values were shown by magnesium salts, salt, soda, potash, bromine, and calcium chloride, but not enough to offset the losses in value shown by borates and iodine. The group as a whole showed a decrease in total value from \$10,413,019 in 1934 to \$9,700,802 in 1935.

The delay in final compilation of the detailed figures for 1935, has been due to late receipt of the data on gold, silver, and petroleum, for which the Division of Mines depends upon other agencies.

By Substances.

The following table shows the comparative yield of mineral substances of California for 1934 and 1935, as compiled from the returns received at the State Division of Mines, San Francisco, in answer to inquiry sent to producers:

Substance	1934		1935		Increase + Decrease— Value
	Amount	Value	Amount	Value	
Barite.....	21,769 tons	\$125,514	22,979 tons	\$133,810	\$8,296 +
Bentonite (Fuller's Earth).....	6,168 tons	69,325	10,204 tons	68,372	953—
Borax.....	240,696 tons	5,524,262	280,249 tons	4,602,064	922,198—
Brick and hollow building tile.....		1,644,661		1,855,343	210,682 +
Cement.....	8,936,085 bbls.	12,445,616	8,086,292 bbls.	10,120,721	2,524,895—
Chromite.....	294 tons	3,498	523 tons	6,111	2,613 +
Clay (pottery).....	190,510 tons	245,900	240,014 tons	377,969	132,069 +
Coal.....	13,549 tons	52,720	8,049 tons	32,745	19,975—
Copper.....	590,068 lbs.	47,252	2,031,836 lbs.	168,645	121,393 +
Gems.....		2,456		945	1,511—
Gold.....	719,084 fine ozs.	25,131,284	890,430 fine ozs.	31,165,050	6,033,766 +
Granite.....		240,083		339,917	90,834 +
Gypsum.....	58,149 tons	113,606	70,833 tons	151,807	38,201 +
Iodine.....	355,279 lbs.	423,016	*	*	* —
Lead.....	804,911 lbs.	29,782	1,142,405 lbs.	45,695	15,913 +
Lime.....	32,500 tons	309,765	59,731 tons	573,212	263,447 +
Limestone.....	198,057 tons	461,139	227,214 tons	496,054	34,915 +
Magnesium salts.....	2,325 tons	194,642	2,795 tons	235,531	40,889 +
Marble ^a		10,759		9,884	875—
Mineral water.....	19,882,436 gals.	1,071,197	16,659,254 gals.	940,333	130,864—
Natural gas.....	263,207,517 M cu.ft.	14,408,761	302,447,193 M cu.ft.	17,680,661	3,271,900 +
Petroleum.....	174,721,282 bbls.	159,529,671	205,979,855 bbls.	179,335,311	19,805,640 +
Platinum.....	520 ozs.	14,884	147 ozs.	4,152	10,732—
Pumice and volcanic ash.....	9,951 tons	54,248	14,890 tons	87,055	32,807 +
Quicksilver.....	7,946 flasks	534,135	9,353 flasks	628,590	94,455 +
Salt.....	332,194 tons	1,222,810	365,711 tons	1,230,480	7,670 +
Sandstone.....		14,245		9,268	4,977—
Silica (sand and quartz).....	70,432 tons	296,643	70,835 tons	297,272	629 +
Silver.....	844,413 fine ozs.	545,883	1,191,112 fine ozs.	856,112	310,229 +
Slate.....	5,065 tons	24,245		40,912	16,667 +
Soapstone and Talc.....	13,920 tons	158,606	17,332 tons	170,830	12,224 +
Soda.....	99,380 tons	1,219,561	125,504 tons	1,341,045	121,484 +
Stone, miscellaneous ^b		7,131,330		5,571,041	1,560,289—
Sulphur.....	4,412 tons	67,656	*	*	* —
Tungsten ore.....	261 tons	224,417	118 tons	194,542	29,875—
Zinc.....	721,719 lbs.	31,034	328,013 lbs.	14,432	16,602—
Unapportioned.....		3,741,103		4,618,406	877,303 +
Total values.....		\$237,374,709		\$263,404,317	-----
Net increase.....					\$26,029,608

* Included under 'Unapportioned.'

^a Includes onyx and travertine.

^b Includes macadam, crushed rock, ballast, rubble, rip rap, sand, gravel.

^c Includes bituminous rock, asbestos, bromine, calcium chloride, carbon dioxide, diatomite, dolomite, feldspar, fluor-spar, iron ore, magnesite, manganese ore, molybdenum ore, potash, pyrite, sillimanite-andalusite-cyanite group, paving blocks, tube-mill pebbles, wollastonite.

^d Includes bituminous rock, bromine, calcium chloride, carbon dioxide, diatomite, dolomite, feldspar, graphite, iodine, iron ore, magnesite, manganese ore, mica, mineral paint, potash, pyrite, sillimanite-andalusite-cyanite group, sulphur and tube-mill pebbles.

By Counties.

The following table shows the comparative value of the mineral production of the various counties in the State for the years 1934 and 1935:

<i>County</i>	<i>1934 Value</i>	<i>1935 Value</i>
Alameda	\$2,379,633	\$2,010,493
Alpine	25,431	9,441
Amador	2,400,161	2,765,299
Butte	637,962	1,009,952
Calaveras	2,196,592	2,312,953
Colusa	45,875	1,901
Contra Costa	1,734,999	1,361,616
Del Norte	81,998	46,589
El Dorado	1,738,576	2,388,999
Fresno	5,772,807	30,016,686
Glenn	30,608	41,287
Humboldt	81,432	85,065
Imperial	108,480	124,135
Inyo	1,293,725	1,559,806
Kern	37,053,187	46,944,409
Kings	28,067,389	10,580,002
Lake	260,481	320,750
Lassen	28,318	21,732
Los Angeles	66,359,227	72,148,990
Madera	264,142	306,644
Marin	183,354	113,914
Mariposa	807,908	873,242
Mendocino	14,351	10,429
Merced	1,050,492	1,704,775
Modoc	48,117	52,432
Mono	212,438	223,748
Monterey	190,902	132,689
Napa	398,214	198,156
Nevada	7,488,996	9,195,148
Orange	25,746,031	24,360,634
Placer	678,232	1,026,451
Plumas	181,143	414,516
Riverside	2,590,545	2,226,623
Sacramento	3,877,757	4,336,763
San Benito	266,857	242,254
San Bernardino	10,537,050	9,886,453
San Diego	487,266	471,387
San Francisco	28,641	892
San Joaquin	148,097	416,270
San Luis Obispo	138,453	265,443
San Mateo	1,562,490	1,590,159
Santa Barbara	7,570,191	8,680,173
Santa Clara	386,445	312,676
Santa Cruz	1,796,844	1,533,433
Shasta	1,145,180	1,350,262
Sierra	1,046,307	860,716
Siskiyou	648,166	705,737
Solano	23,641	7,450
Sonoma	162,005	170,800
Stanislaus	418,177	585,656
Sutter	3,322	357
Tehama	39,575	11,391
Trinity	650,620	745,186
Tulare	184,474	53,911
Tuolumne	423,588	474,610
Ventura	13,688,749	14,236,946
Yolo	38,027	34,665
Yuba	1,951,046	1,841,221
Total value	\$237,375,709	\$263,404,317

Total Mineral Production of California, by Years, Since 1887.

The following tabulation gives the total value of mineral production of California by years since 1887, in which year compilation of such data by the State Mining Bureau (now Division of Mines) began. At the side of these figures have been placed the values of the most important metal and nonmetal items—gold and petroleum.

In the same period copper made an important growth beginning with 1897 following the entry of the Shasta County mines, and later Plumas County. Cement increased rapidly from 1902, while crushed

rock, sand and gravel as a group paralleled the cement increase. Quicksilver has been up and down. Mineral water and salt have always been important items, but the values fluctuate. Borax has increased materially since 1896. War-time increases, 1915-1918, were shown by chromite, copper, lead, magnesite, manganese, silver, tungsten and zinc. Most of these have since declined, though silver, structural materials and copper increased in 1920-1924, also lead and magnesite in 1923; lead and zinc in 1925; zinc in 1926, with silver declining; an increase in quicksilver in 1927-1928, with declines in other metals and by petroleum. Natural gas showed a steady increase from 1907, and in 1928-1933 its value was second only to petroleum.

In 1929 the annual output of gold was the smallest since its discovery. From 1929 to 1935 there was a rapid increase in gold production, due in part to the raise in its price per ounce.

Total Mineral Production of California, by Years, Since 1887

Year	Total value of all minerals	Gold, value	Petroleum, value
1887	\$19,785,868	\$13,588,614	\$1,357,144
1888	19,469,320	12,750,000	1,380,666
1889	16,681,731	11,212,913	368,048
1890	18,039,666	12,309,793	384,200
1891	18,872,413	12,728,869	401,264
1892	18,300,168	12,571,900	561,333
1893	18,811,261	12,422,811	608,092
1894	20,203,294	13,923,281	1,064,521
1895	22,844,663	15,334,317	1,000,235
1896	24,291,398	17,181,562	1,180,793
1897	25,142,441	15,871,401	1,918,269
1898	27,289,079	15,906,478	2,376,420
1899	29,313,460	15,336,031	2,660,793
1900	32,622,945	15,863,355	4,152,928
1901	34,355,981	16,989,044	2,961,102
1902	35,069,105	16,910,320	4,692,189
1903	37,759,040	16,471,264	7,313,271
1904	43,778,348	19,109,600	8,317,809
1905	43,069,227	19,197,043	9,007,820
1906	46,776,085	18,732,452	9,238,020
1907	55,697,949	16,727,928	16,783,943
1908	66,363,198	18,761,559	26,566,181
1909	82,972,209	20,237,870	32,398,187
1910	88,419,079	19,715,440	37,689,542
1911	87,497,879	19,738,908	40,552,088
1912	88,972,385	19,713,478	41,868,344
1913	98,644,639	20,406,958	48,578,014
1914	93,314,773	20,653,496	47,487,109
1915	96,663,369	22,442,296	43,503,837
1916	127,901,610	21,410,741	57,421,334
1917	161,202,962	20,087,504	86,976,209
1918	199,753,837	16,529,162	127,459,221
1919	195,830,002	16,695,955	142,610,563
1920	242,099,667	14,311,043	178,394,937
1921	268,157,472	15,704,822	203,138,225
1922	245,183,826	14,670,346	173,381,266
1923	344,024,678	13,379,013	242,731,309
1924	374,620,789	13,150,175	274,652,874
1925	434,519,660	13,065,330	330,609,829
1926	450,330,856	11,923,481	345,546,677
1927	366,781,394	11,671,018	260,735,498
1928	332,224,233	10,785,315	229,998,680
1929	432,248,228	8,526,703	321,366,863
1930	365,604,695	9,451,162	271,699,046
1931	215,964,420	10,814,162	141,835,723
1932	199,196,493	11,765,726	142,890,247
1933	206,489,058	15,683,075	143,063,972
1934	237,374,709	25,131,284	159,529,671
1935	263,404,317	31,165,050	179,335,311
Totals	\$6,974,533,879	\$788,729,048	\$4,409,749,616

CHAPTER TWO

FUELS

Among the most important mineral products of California are its fuels. This subdivision includes coal, natural gas, and petroleum, the combined values which make up practically 75 per cent of the State's entire mineral output for the year 1935.

There are deposits of peat known in several localities in California, small amounts of which are used as a fertilizer, and in stock-food preparations, but none has yet been recorded as utilized for fuel.

Comparison of values during 1934 and 1935 is shown in the following table:

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Coal.....	13,548 tons	\$52,720	8,049 tons	\$32,745	\$20,075—
Natural gas.....	263,207,517 M cu.ft.	14,408,761	302,447,193 M cu.ft.	17,680,661	3,271,900+
Petroleum.....	174,721,282 bbls.	159,529,671	205,979,855 bbls.	179,335,311	19,805,640+
Total values.....		\$173,991,152		\$197,048,717	
Net increase.....					\$23,057,565+

COAL

Bibliography: State Mineralogist Reports VII, XII-XV (inc.), XVII, XIX-XXVIII (inc.), XXVI, XXXI. U. S. Geol. Surv., Bulletins 285, 316, 431, 471, 581; Ann. Rept. 22, Pl. III.

The coal production in California during 1935 totaled 8,049 short tons valued at \$32,745, as compared with the 1934 output, which was 13,549 tons worth \$52,720. The material mined in 1935 came from a single property each, in Amador, Monterey, and Trinity counties. This coal was consumed by the local market and also used on the property for camp purposes, power and forge, to carry on regular operations and development work.

Total Coal Production of California.

The very considerable output of coal in the years previous to 1883 was almost entirely from the Mount Diablo district, Contra Costa County. Later the Tesla mine in Corral Hollow, Alameda County, was an important producer for a few years. Stone Canyon, Monterey County, was also an important producer for a short time, and there has been some coal shipped from properties in Amador, Fresno, Orange, Riverside, Siskiyou and Trinity counties. The following tabulation gives the annual tonnages and values, according to available records:

Coal Output and Value, by Years

Year	Tons	Value	Year	Tons	Value
1861	6,620	\$38,065	1899	160,941	\$420,109
1862	23,400	134,550	1900	176,956	535,531
1863	43,200	248,400	1901	150,724	401,772
1864	50,700	291,525	1902	88,460	248,622
1865	60,530	348,048	1903	93,026	265,383
1866	84,020	483,115	1904	79,062	376,494
1867	124,690	716,968	1905	46,500	144,500
1868	143,676	826,137	1906	24,850	61,600
1869	157,234	904,096	1907	23,734	55,849
1870	141,890	815,868	1908	18,496	55,503
1871	152,493	876,835	1909	49,389	216,913
1872	190,859	1,097,439	1910	11,033	23,484
1873	186,611	1,073,013	1911	11,047	18,297
1874	215,352	1,238,274	1912	14,484	39,092
1875	166,638	958,169	1913	25,198	85,809
1876	128,049	736,282	1914	11,859	28,806
1877	107,789	619,787	1915	10,299	26,662
1878	134,237	771,863	1916	4,037	7,030
1879	147,879	850,304	1917	3,527	7,691
1880	236,950	1,362,463	1918	6,343	16,149
1881	140,000	805,000	1919	2,983	8,203
1882	112,592	647,404	1920	2,078	5,450
1883	76,162	380,810	1921	12,467	63,578
1884	77,485	309,950	1922	27,020	135,100
1885	71,615	286,460	1923	1,010	5,090
1886	100,000	300,000	1924	1,425	8,800
1887	50,000	150,000	1925	730	3,880
1888	95,000	380,000	1926	1,100	5,000
1889	121,280	288,232	1927	200	1,100
1890	110,711	283,019	1928	782	4,542
1891	93,301	204,902	1929	450	2,476
1892	85,178	209,711	1930	10,885	59,858
1893	72,603	167,555	1931	12,551	77,607
1894	59,887	139,862	1932	9,508	36,468
1895	79,858	193,790	1933	2,612	11,367
1896	70,649	161,335	1934	13,549	52,720
1897	87,449	196,255	1935	8,049	32,745
1898	143,045	337,475			
			Totals	5,266,996	\$23,382,241

The tonnages in the above table for the years 1861-1886 (incl.) are taken from the U. S. Geological Survey, "Mineral Resources of the U. S., 1910," p. 107. The values assigned for the years previous to 1883 are those given by W. A. Goodyear (Mineral Res., 1882, pp. 93-94), being an average of \$5.75 per ton. From 1887 to date the figures are those of the California State Mining Bureau.

NATURAL GAS

Bibliography: State Mineralogist Reports VII, X, XII, XIII, XIV, XXIX. Bulletins 3, 16, 19, 69, 73, 89. Monthly Summary Oil and Gas Supervisor, Dec., 1919; Aug., 1922; Mar., 1923; Mar. and Apr., 1926.

Statistics on the production of natural gas in California are in a considerable degree difficult to arrive at, as much of it that is utilized directly at the wells for heating, lighting, and driving gas engines is not measured. Hence, it is necessary to approximate the output of many of the operators in the oil fields, estimated on the number of lights, and on the number and horsepower of gas engines and steam boilers thus operated. The figures here given are for gas utilized locally and also that sold for distribution to consumers; and we consider are not over-estimated, particularly in the six oil-producing counties. It must be remembered that some of our important oil fields are removed many miles from the site of any other industry, and that the gathering of

small amounts of gas and transporting it for any considerable distance may not always be profitable, nor is it often possible to have pipe-line facilities available to handle the gas accompanying the early gas production in newly developed fields. Wherever feasible, casing-head gas is used in driving gas engines for pumping and drilling, and in firing the boilers of steam driven plants.

Actual Production of Natural Gas—How Disposed of in California—1935

<i>County</i>	<i>Production M cu. ft.</i>	<i>Utilized M cu. ft.</i>	<i>Wasted M cu. ft.</i>	<i>Stored M cu. ft.</i>
Fresno-----	65,499,962	63,579,904	1,861,343	58,715
Kern-----	46,514,140	36,089,134	8,965,897	1,459,109
Kings-----	67,040,315	65,372,401	1,599,592	68,322
Los Angeles-----	70,548,881	66,416,318	2,837,319	1,295,244
Orange-----	28,415,526	25,810,647	2,565,175	39,704
Santa Barbara-----	5,302,505	4,596,531	546,662	159,312
Ventura-----	41,089,879	39,278,994	998,731	812,154
Other counties-----	1,319,184	1,303,264	15,920	-----
Totals-----	325,730,392	302,447,193	19,390,639	3,892,560

Production and Value.

There is a rather wide variation in prices quoted for natural gas because a considerable part is used directly in the field for driving gas engines and firing boilers, and is therefore not measured nor sold. Such companies as have placed a valuation on the gas that was thus used in 1935 gave from 2¢ to 75¢ per 1000 cu. ft. at the well. From the totals shown in the tabulation following herein, the average value for all fields in 1935 works out at approximately 5.85¢ per M cu. ft. Approximately 7000 cu. ft. of gas is equal to one barrel of oil in heating value, and is so accounted for by many operators. In driving gas engines, about 4000 cu. ft. per 24 hr. are consumed by a 25-h.p. engine, and 63,700 cu. ft. per day for heating a 70-h.p. steam boiler, which figures have been utilized in compiling this report, in those cases where gas was not metered.

Utilized Production of Natural Gas in California, 1935

<i>County</i>	<i>M cu. ft.</i>	<i>Value</i>
Fresno-----	63,579,904	\$3,687,049
Kern-----	36,089,134	1,891,675
Kings-----	65,372,401	3,088,477
Los Angeles-----	66,416,318	4,448,950
Orange-----	25,810,647	1,802,397
Santa Barbara-----	4,596,531	524,998
Ventura-----	39,278,994	2,036,287
Butte, Humboldt, Lake, Mendocino, Monterey, Sacramento, San Joaquin, Santa Clara, Tulare *-----	1,303,264	200,828
Totals-----	302,447,193	\$17,680,661

* Combined to conceal the output of individual operators in each.

The above totals show increases in amount and value over those of 1934 which were 263,207,517 M cu. ft. valued at \$14,408,761. Los Angeles County lead in the yield of natural gas during 1935, followed by Kings County. Increased values of output were shown by Fresno, Kern, Los Angeles, Orange, Santa Barbara, and Ventura counties; and San Joaquin is now producing over a million M cu. ft. Decreased production was reported by Kings County.

Natural Gas Production in California Since 1888.

The production of natural gas in California by years since 1888 is given in the following table. The first economic use of natural gas in California was from the famous courthouse well at Stockton, bored in 1854-1858. Beginning about 1883 and for several succeeding years, a number of gas wells were brought in around Stockton, and later at Sacramento. Natural gas was known in a number of other localities, and occasionally utilized in a small way, notably at Kelseyville in Lake County, and in Humboldt County near Petrolia and Eureka, but there are no available authentic records of amounts or values previous to the year 1888. The most important developments in the commercial production of natural gas have been coincident with developments in the oil fields, by utilizing the casing-head gas as well as that from dry-gas wells.

Natural Gas Production in California Since 1888

Year	M cubic feet	Value	Year	M cubic feet	Value
1888.....	•12,000	\$10,000	1913.....	14,210,836	\$1,053,292
1889.....	•14,500	12,680	1914.....	16,529,963	1,049,470
1890.....	•41,250	33,000	1915.....	21,992,892	1,706,480
1891.....	•39,000	30,000	1916.....	28,134,365	2,871,751
1892.....	•75,000	55,000	1917.....	44,343,020	2,964,922
1893.....	•84,000	68,500	1918.....	46,373,052	3,289,524
1894.....	•85,000	75,000	1919.....	52,173,603	4,041,217
1895.....	•b110,000	100,000	1920.....	58,567,772	3,898,286
1896.....	•b131,000	110,157	1921.....	67,043,797	4,704,678
1897.....	•71,300	62,657	1922.....	103,628,027	6,990,030
1898.....	•111,165	74,424	1923.....	240,405,397	15,661,433
1899.....	115,110	95,000	1924.....	209,021,596	15,153,140
1900.....	40,566	34,578	1925.....	194,719,924	15,890,082
1901.....	120,800	92,034	1926.....	214,549,477	19,465,347
1902.....	120,968	99,443	1927.....	224,686,940	20,447,294
1903.....	120,134	75,237	1928.....	260,887,116	22,260,947
1904.....	144,437	91,035	1929.....	400,129,201	29,675,546
1905.....	148,345	102,479	1930.....	315,513,952	24,559,840
1906.....	168,175	109,489	1931.....	344,959,920	16,690,695
1907.....	169,991	114,759	1932.....	284,168,872	16,272,061
1908.....	842,883	474,584	1933.....	271,743,544	15,403,514
1909.....	1,148,467	616,932	1934.....	263,207,517	14,408,761
1910.....	10,579,933	1,676,367	1935.....	302,447,193	17,680,661
1911.....	•5,000,000	491,859			
1912.....	•12,600,000	940,076	Totals.....	4,012,431,900	\$281,784,281

• Quantity, in part, estimated, where values only were reported.

• Tabulations published previously to 1933 included values of CO₂, now shown under "Industrial Materials."

Gasoline from Natural Gas.

More or less gas usually accompanies the petroleum in the oil fields, and such gas carries varying amounts of gasoline. A total of 91 plants were in operation in 1935 recovering gasoline by compression or absorption from this 'casing-head' gas. After the gasoline is extracted the remaining 'dry gas' so far as practicable is taken into pipe lines, by which it is distributed to consumers, both domestic and commercial.

A total of 540,927,628 gallons of casing-head gasoline valued at \$26,352,213 was reported made from all fields in California by 91 plants during 1935 compared with 505,929,436 gallons worth \$31,089,877 from 95 plants in 1934. The 1935 output was distributed as follows:

<i>County</i>	<i>No. plants</i>	<i>Gallons</i>	<i>Value</i>
Fresno -----	1	26,651	\$2,822
Kern -----	6	50,096,444	2,426,984
Kings -----	18	154,221,269	8,012,161
Los Angeles -----	37	209,841,611	9,590,118
Orange -----	15	66,729,467	3,360,889
Santa Barbara -----	5	10,387,201	508,400
Ventura -----	9	49,624,985	2,450,839
Totals -----	91	510,929,628	\$26,352,213

The usual recoveries of gasoline from natural gas vary from $\frac{1}{2}$ gal. to 3 gal. per 1000 cu. ft. of gas handled, the average being about 1 gal. per 1000 cu. ft. The U. S. Bureau of Mines Report by Knudsen¹ gives the average recovery for 1935 as 1.572 gallons per 1000 cu. ft. of gas treated. His figures show the following production by methods:

	<i>M cu. ft. natural gas treated</i>	<i>Gallons of gasoline recovered</i>	<i>Recovery gallons per M cu. ft.</i>
Oil absorption -----	336,763,011	529,637,006	1.544

PETROLEUM

Bibliography: State Mineralogist Reports IV, VII, X, XII, XIII, XXIX, XXXI. Bulletins 3, 11, 16, 19, 31, 32, 63, 69, 73, 82, 84, 89. Reports of Oil and Gas Supervisor 1915 to date (issued in monthly chapters since April, 1919, to June, 1929, and quarterly from then on). U. S. Geol. Surv. Bulletins 213, 285, 309, 317, 321, 322, 340, 357, 398, 406, 431, 471, 541, 581, 603, 621, 623, 653, 691. Prof. Papers 116, 117. "American Petroleum; Supply and Demand"; Amer. Petr. Inst., 1925.

The crude petroleum produced in California during 1935 amounted to a total of 205,979,855 barrels having a value of \$179,335,311 at the well. This was an increase in both amount and value as compared with the 1934 output, which was 174,721,282 barrels worth \$159,529,671.

This total of quantity is compiled from the monthly production reports filed by the operators with the State Oil and Gas Supervisor.

The question of the value of the crude oil yield at the well is a difficult one to settle with exactitude principally because a large part of the output is not sold until after refining. The large refiners are also large producers of crude oil which they send direct from well to plant, hence much of the crude oil is not sold as such.

The value used in the statistical reports of the State Mining Bureau and the Division of Mines from 1914 to 1927 (inc.) was derived from an average of actual sales of crude oil of all grades in each field of the State and their average applied to the total yield of each respective field. The 1929-1933 values, used by the Division of Mines, were obtained by using the production of crude oil by gravities produced in each field² and applying an average of current price quotations for crude oil at the well as compiled by California Oil and Gas Association.

The value given to the 1934-1935 petroleum output by this department was obtained by using the average gravity oil for each field, to which was applied the average quotation for the year of said grade oil.

¹ Knudsen, E. T., The Petroleum Situation in the Pacific Coast Territory (Monthly for 1935), U. S. Bureau of Mines.

² By courtesy of Standard Oil Co. of California.

TABLE A
Production and Value of Crude Oil by Counties

County	1934		1935	
	Barrels	Value	Barrels	Value
Fresno	6,607,661	\$4,295,980	27,679,545	\$26,047,611
Kern	41,823,494	30,475,225	54,723,481	39,905,553
Kings	21,393,483	23,104,962	7,167,687	7,490,233
Los Angeles	60,297,000	59,711,578	70,378,196	64,339,261
Orange	25,891,732	24,258,123	24,971,601	22,422,526
Santa Barbara	6,648,120	6,322,148	7,649,068	7,068,739
Ventura	12,007,550	11,331,335	13,333,298	12,016,509
Colusa, San Bernardino, San Luis Obispo, San Mateo, Santa Clara, Tulare*	52,242	30,320	-----	-----
San Luis Obispo, Santa Clara, and Tulare*	-----	-----	76,979	44,879
Totals	174,721,282	\$159,529,671	205,979,855	\$179,335,311

* Combined to conceal the output of operators in each.

The foregoing totals show the average price of \$0.870 per barrel for the year 1935, as compared with \$0.913 in the year 1934, \$0.831 in 1933, \$0.807 in 1932, \$0.753 in 1931, and \$1.195 in 1930.

TABLE B
Average Price of Oil per Barrel, by Counties, 1926-1935

County	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Fresno	\$0.815	\$0.830	\$0.764	\$0.519	\$0.568	\$0.551	\$0.556	\$0.573	\$0.650	\$0.941
Kern	1.445	1.139	.835	.741	.838	.636	.658	.665	.729	.729
Kings	-----	-----	-----	1.674	1.515	.723	.837	.934	1.085	1.045
Los Angeles	1.645	1.115	1.051	1.189	1.297	.784	.860	.892	.990	.914
Orange	1.559	1.207	.935	.986	1.060	.753	.762	.827	.937	.898
San Luis Obispo	-----	-----	-----	-----	-----	-----	.550	-----	-----	-----
Santa Barbara	.793	.750	1.108	1.255	1.404	.954	.962	.848	.951	.924
Santa Clara	-----	-----	-----	-----	-----	-----	.550	-----	-----	-----
Ventura	1.512	1.177	1.098	1.150	1.396	.771	.849	.838	.944	.901
State averages	\$1.538	\$1.127	\$0.992	\$1.094	\$1.195	\$0.753	\$0.807	\$0.831	\$0.913	\$0.870

For several years previous to 1919, the State average value per barrel at the well for crude oil as determined by the statistical returns was noted to practically coincide with the quotations during the same years for 23° gravity oil in the San Joaquin Valley fields. In 1919 and since, the average values have worked out at figures corresponding to quotations up to, in one year as high as 28° oil, due to the large yield of high-gravity oils from the new fields in the Los Angeles-Orange counties area.

TOTAL PETROLEUM PRODUCTION OF CALIFORNIA

The presence of oil seepages and springs in Los Angeles and Ventura counties was known and utilized in a small way early in the history of California. Some also was shipped to refineries at San Francisco from Santa Barbara and Humboldt counties. In the light of present-day developments, the following reference to the previous year's production of oil and its future prospects as expressed by the San Francisco Bulletin of January 8, 1866, is strikingly prophetic even though skeptical:

"It is possible that the small quantity received (40,000 or 50,000 gallons in 1865) may be the forerunner of many millions which will, at some future time, lubricate the wheels of commerce and set a trade at work excelling in variety any that has

thus far been known on this coast. At present, however, we admit to being a little skeptical about the assumption of the astute Professor Silliman that California will be found to have more oil in its soil than all the whales in the Pacific Ocean."

According to Hanks,¹ in 1874 production amounted to 36 bbl. per day from natural flows in Pico Cañon (Newhall), and at Sulphur Mountain (Ventura County), the oil being of 32° gravity average.

"Work was commenced in Pico Canyon in 1875 by drilling three shallow wells with spring pole, all of which yielded oil at depths of from 90 to 250 feet. Actual work of development commenced with steam machinery in 1877."²

In 1877 Pico averaged 40-50 bbl. daily, and Ventura 80 bbl. daily. In 1878, there was some production (at 60 bbl. per day, for a time) from wells in Moody Gulch, near Los Gatos, Santa Clara County, the oil being of 46° Baumé.

The first wells in the Coalinga, Fresno County, and Summerland, Santa Barbara County, fields were drilled in 1890, but Coalinga did not make its influence felt conspicuously on the state's annual output until 1903. The Summerland yield never has been large. The Salt Lake field near Los Angeles began production in 1894 and in 1897 reached over a million barrels annually.

In the Kern County fields, the first well was drilled in Sunset in 1891, Midway in 1900, McKittrick in 1892, Kern River in 1899. The Sunset-Midway district attained a yield of over 4,000,000 bbl. in 1909, and over 20,000,000 bbl. in 1910. Kern River field produced over 3,000,000 bbl. in 1901.

The first well in the Santa Maria-Lompoc group, Santa Barbara County, was drilled in 1901, and the district advanced to a yield of over 3,000,000 bbl. annually in 1905.

The Whittier-Fullerton field in Los Angeles and Orange counties became an important factor in 1902. The Montebello field, Los Angeles County, was the conspicuous addition in 1918-1919; and Elk Hills, Kern County, with Huntington Beach and Richfield, Orange County, in 1920. In 1921, the new fields added were Long Beach and Santa Fe Springs, Los Angeles County; in 1922, Torrance field in Los Angeles County, and Wheeler Ridge field in Kern County; but the production from the large number of new wells started in these new Los Angeles County fields did not reach its peak until August and September, 1923. Dominguez (Compton) came in during 1923; followed by Rosecrans and Inglewood in 1924. Ventura recorded important additions to its producing area in 1925 and 1926. Seal Beach, Orange County, and Mt. Poso, Kern County, were the new fields added in 1926; Round Mountain, Kern County, and Rincon, Ventura County, were the new fields added in 1927; with Potrero in Los Angeles County, Elwood in Santa Barbara County and Kettleman Hills in Kings County in 1928.

During 1929 Playa del Rey was added to the oil fields in Los Angeles County.

The effect of the advent of these various fields to the producing column will be noted in the tabulation herewith, by years:

¹ Hanks, Henry G., Report IV of State Mineralogist, p. 298, 1884.

² *Idem*, p. 301.

TABLE C
Total Petroleum Production In California

Year	Barrels	Value	Year	Barrels	Value
To and inc. 1875	^a 175,000	^b \$472,500	1906	32,624,000	\$9,238,020
1876	12,000	30,000	1907	40,311,171	16,783,943
1877	13,000	29,250	1908	48,306,910	26,566,181
1878	15,227	30,454	1909	58,191,723	32,398,187
1879	19,858	39,716	1910	77,697,568	37,689,542
1880	40,552	60,828	1911	84,648,157	40,552,088
1881	99,862	124,828	1912	89,689,250	41,868,344
1882	128,636	257,272	1913	98,494,532	48,578,014
1883	142,857	285,714	1914	102,881,907	47,487,109
1884	262,000	655,000	1915	91,146,620	43,503,837
1885	325,000	750,750	1916	90,262,557	57,421,334
1886	^a 377,145	^b 870,205	1917	95,396,309	86,976,209
1887	678,572	1,357,144	1918	99,731,177	127,459,221
1888	690,333	1,380,666	1919	101,182,962	142,610,563
1889	303,220	368,048	1920	103,377,361	178,394,937
1890	307,360	384,200	1921	112,599,860	203,138,225
1891	323,600	401,264	1922	138,468,222	173,381,265
1892	385,049	561,333	1923	262,875,690	242,731,309
1893	470,179	608,092	1924	228,933,471	274,652,874
1894	783,078	1,064,521	1925	232,492,147	330,609,829
1895	1,245,339	1,000,235	1926	224,673,281	345,546,677
1896	1,257,780	1,180,793	1927	231,195,774	260,735,498
1897	1,911,569	1,918,269	1928	231,811,465	229,998,680
1898	2,249,088	2,376,420	1929	292,534,221	321,366,863
1899	2,677,875	2,660,793	1930	227,328,988	271,699,046
1900	4,319,950	4,152,928	1931	188,310,605	141,835,723
1901	7,710,315	2,961,102	1932	177,745,286	142,890,247
1902	14,356,910	4,692,189	1933	172,139,362	143,063,972
1903	24,340,839	7,313,271	1934	174,721,282	159,529,671
1904	29,736,003	8,317,809	1935	205,979,855	179,335,311
1905	34,275,701	9,007,820			
			Totals	4,445,385,610	\$4,413,356,133

^a U. S. G. S., Min. Res. of U. S., 1886, p. 440, for quantities to and including 1886.

^b Values have been estimated for the years to and including 1886, after consulting a number of contemporaneous publications, including the Mining & Scientific Press, Reports of the State Mineralogist, and U. S. Reports. The figures for 1887 to date are from records of the State Mining Bureau.

Well Data.

The following table is compiled from monthly statements issued by the American Petroleum Institute:

TABLE D
Wells Operated, by Fields, 1935

Field	Wells producing Dec., 1934	Wells producing Dec., 1935	Wells com- pleted during year	Daily initial output	Wells aban- doned during year	Bbls. per well produced per day Dec., 1934	Bbls. per well produced per day Dec., 1935
GROUP No. 1— Belridge—North.....	23	31	10	26,853		229.4	239.8
Belridge—South.....	140	169				21.6	14.8
Coalinga.....	952	982	9	437	28	18.8	20.3
Edison.....	14	57	48	11,469	19	106.1	47.1
Elk Hills.....	168	167			5	47.8	52.8
Fruitvale.....	67	82	17	4,473	2	52.6	61.7
Kern River.....	1,385	1,536	44	11,043	11	7.5	13.6
Kettleman M. D.....	2	2				252.5	52.5
Kettleman N. D.....	75	122	35	147,566	4	786.3	433.2
Lost Hills.....	315	327	1	112	5	14.4	14.8
McKittrick.....	184	199	4	609	6	17.1	19.2
Midway-Sunset.....	2,478	2,546	42	10,550	57	20.7	21.8
Mountain View.....	50	114	69	156,368	10	223.5	221.8
Mt. Poso.....	152	225	63	36,820	16	74.8	67.5
Round Mountain.....	49	72	16	14,715	3	95.1	88.6
Wheeler Ridge.....	34	34	1	75	1	12.0	12.3
GROUP No. 2— Capitan.....	13	15	8	1,808	2	56.2	95.3
Elwood.....	51	64	11	16,396	2	189.4	195.2
Rincon.....	30	29	1	420	2	36.6	63.3
San Miguelito.....	4	5	1	1,577		156.5	162.4
Santa Barbara.....	52	67	21	12,345	14	81.2	48.8
Santa Maria.....	187	211	4	717	11	25.4	19.9
Summerland.....	17	19			4	2.4	2.1
Ventura Avenue.....	178	232	18	7,789	3	131.2	129.7
Ventura-Newhall.....	464	552	7	1,105	21	8.9	7.3
Watsonville.....	7	7				8.6	8.6
GROUP No. 3— Brea-Olinda.....	352	375	2	147	2	29.8	26.4
Coyote—East.....	76	84	2	160		33.8	32.2
Coyote—West.....	25	61	8	7,854	1	352.4	159.6
Dominguez.....	71	100	32	25,896	1	357.8	216.9
Huntington Beach.....	469	510	18	9,649	13	86.8	81.3
Inglewood.....	206	220	23	22,574	8	46.9	55.8
Lawndale.....	6	7	1	250	1	21.1	25.1
Long Beach.....	1,091	1,269	124	33,088	84	57.1	57.3
Los Angeles—							
Salt Lake.....	126	128			6	6.4	6.3
Montebello.....	160	183	10	5,207	4	38.6	34.2
Newport.....					3		
Playa del Rey.....	160	208	42	82,278	9	53.5	75.0
Potrero.....	12	11			2	36.9	33.6
Richfield.....	249	249			6	32.9	30.8
Rosecrans.....	70	76	1	184	7	41.2	35.8
Santa Fe Springs.....	492	631	29	7,346	24	78.6	70.2
Seal Beach.....	110	107	4	2,789	7	79.1	96.6
Torrance.....	474	506	3	311	14	14.7	64.0
Whittier.....	159	161				7.0	6.5
GROUP No. 4— Buttonwillow							
Gas Field.....		24	3	(Gas)			
Delano Gas Field.....			5	(Gas)	3		
Dudley Ridge							
Gas Field.....					5		
Goleta Gas Field.....			2	(Gas)			
Semi-Tropic Gas							
Field.....			22	(Gas)	12		
Tracy Gas Field.....		2	2	(Gas)	1		
Miscellaneous drilling.....							
Totals.....	11,399	12,136	763	660,980	550	42.3	46.9

Specific Gravity of Oils Produced.

The proportion of heavy and light oil produced in the various fields is shown in Table E, following, for which we are indebted to the Standard Oil Company. Specific gravities in California range from 8°

Baumé in the Casmalia field, Santa Barbara County, to 60° in Kettleman Hills, Kings County.

California crude oils are all essentially of asphalt base, with a few notable exceptions. In the following localities are wells yielding crudes containing both asphalt and paraffine constituents: Oil City field, Coalinga; a few deep wells in East Side field, Coalinga, a considerable part of the Ventura County field; Western Minerals area, south of Maricopa; Wheeler Ridge, Kern County.

TABLE E
Production of Light and Heavy Oils, by Fields, for 1935

<i>Field</i>	<i>Under 20° (barrels)</i>	<i>20° and above (barrels)</i>	<i>Total (barrels)</i>
<i>San Joaquin Valley</i>			
Belridge—North	1,875	2,714,920	2,716,795
Belridge—South	476,304	438,626	914,930
Coalinga	2,857,602	4,402,149	7,259,751
Comanche Point	400	—	400
Edison	504,323	426,422	930,745
Elk Hills	753,353	2,460,540	3,213,893
Fruitvale	109,343	1,686,735	1,796,078
Kern River	4,788,019	—	4,788,019
Kettleman Hills (Middle Dome)	—	38,497	38,497
Kettleman Hills (North Dome)	—	27,568,541	27,568,541
Lost Hills	841,790	923,222	1,765,012
McKittrick	1,374,989	5,972	1,380,961
Midway-Sunset	7,972,275	12,261,946	20,234,221
Mountain View	—	9,175,526	9,175,526
Mount Poso	5,383,633	—	5,383,633
Round Mountain	1,911,012	421,394	2,332,406
Wheeler Ridge	—	151,899	151,899
<i>Coastal</i>			
Arroyo Grande	54,432	—	54,432
Capitan	136,399	385,301	521,700
Elwood	—	4,559,969	4,559,969
Lompoc	30,371	55,694	86,065
Newhall	12,565	74,069	86,634
Rincon	—	666,476	666,476
Santa Barbara	1,011,540	70,941	1,082,481
Santa Maria	205,030	1,168,520	1,373,550
San Miguelito	—	296,283	296,283
Summerland	14,199	—	14,199
Ventura Avenue	—	10,969,231	10,969,231
Balance of Ventura County Fields	44,307	1,335,411	1,379,718
Watsonville	22,500	—	22,500
<i>Southern California</i>			
Coyote—East	66,604	906,642	973,246
Coyote—West	—	3,553,922	3,553,922
Del Rey	3,877	5,620,049	5,623,926
Dominguez	—	7,911,300	7,911,300
Huntington Beach	594,859	14,514,886	15,109,745
Inglewood	753,231	3,722,192	4,475,423
Lawndale	—	42,343	42,343
Long Beach	363,856	26,272,436	26,636,292
Los Angeles	100,408	—	100,408
Motobello	188,765	2,093,160	2,281,925
Olinda Brea	256,670	3,351,973	3,608,643
Potrero	—	132,565	132,565
Richfield	427,736	2,359,257	2,786,993
Rosecrans	—	989,302	989,302
Salt Lake	190,986	—	190,986
Santa Fe	54,590	16,072,818	16,127,408
Seal Beach	—	3,374,079	3,374,079
Torrance	1,535,950	942,692	2,478,642
Whittier	261,378	114,022	375,400
Miscellaneous	10,689	21,001	31,690
Totals	33,315,860	174,252,923	207,568,783

Oil in "Storage."

Field, refinery, pipe-line and tank farm stocks of crude and refined products in the Pacific Coast¹ territory totaled 130,628,646 barrels December 31, 1935, as compared with 126,218,317 barrels on December

¹ Standard Oil Bulletin, February, 1936, p. 15.

31, 1934. The total decrease in stock for the year was 25,540,930 barrels.

	<i>Dec. 31, 1934</i> <i>(barrels)</i>	<i>Dec. 31, 1935</i> <i>(barrels)</i>
1. Non-gasoline-bearing crude, Residuum, Gas and Diesel oils-----	67,182,258	68,201,291
2. Gasoline-bearing crude-----	37,549,934	38,950,469
3. Unblended natural gasoline-----	2,446,840	1,568,182
4. Gasoline (not including distributing and service stations)-----	10,313,477	10,760,001
5. Naphtha distillates-----	*928,053	*1,695,564
6. All other stocks-----	†7,767,755	†9,453,139
7. Totals all stock-----	126,218,317	130,628,646
* Estimated amount of unfinished gasoline contained in item No. 5-----	753,082	1,133,084
† Coke included in item No. 6-----	568,915	456,766

Utilization of California's Crude Oil.

Most of the crude oil produced in California is sent to storage reservoirs at tank farms near the oilfields and from these reservoirs by pipelines to the refineries, the larger ones of which are located in the vicinity of Los Angeles and on San Francisco Bay.

During 1935 the crude oil consumed in California, according to the U. S. Bureau of Mines¹ was 177,848,265 barrels sent to stills at the refineries; 1,211,143 barrels went to intercoastal shipments; 14,288,218 barrels to foreign shipments; and 19,915,306 barrels were either consumed as fuel or added to residuum and nongasoline-bearing crude.

The production of petroleum products during 1935 is shown in Table F:

<i>Commodity</i>	<i>Amount in barrels</i>
Crude petroleum-----	177,848,265
Natural gasoline including liquid petroleum gas-----	11,230,988
Gasoline-----	68,934,038
Kerosene-----	5,245,606
Lubricating oils and greases-----	1,843,608
Gas oil and Diesel oil-----	24,522,430
Residuum nongasoline-bearing crude (a)-----	75,390,009
Asphalt and road oils-----	4,926,647
Coke, in tons-----	530,804
Naphtha distillates-----	1,331,659
Other unfinished oils-----	1,515,495
Shortage and still gas production-----	5,319,963
Total petroleum (net) (b)-----	189,079,253
(a) Includes 19,915,306 bbls. of heavy crude oil.	
(b) Total of crude oil and natural gas gasoline.	

Operating Data.

The following tabulation (Table G) is compiled from data published by the State Division of Oil and Gas,² semiannually, and here combined to show the entire year's operations for all fields. The districts are the geographical subdivisions as administered by that Division, and which are outlined on the accompanying map.

It will be noted that the State average yield of oil per-well-per-day was 48.3 barrels for the first six months of 1935, and 55.3 barrels for the second. This is somewhat higher than the figure 46.9 barrels average for December derived from American Petroleum Institute data as shown in Table D, on a previous page, due in part at least, to the fact that the latter is on a full-time basis, whereas the Division's figures allow for shut-down time.

¹ Knudsen, E. T., The petroleum situation in the Pacific Coast territory (monthly) 1935, U. S. Bureau of Mines.

² Summary of Operations—California Oil Fields; Division of Oil and Gas, Fifteenth Annual Report of State Oil and Gas Supervisor, Vol. 21, No. 1, July, Aug., Sept., 1935, and No. 3, Jan., Feb., March, 1936.

MINERAL PRODUCTION OF CALIFORNIA

TABLE G. Production Statistics and Operating Data of California Oil Fields—1935

Field	January 1 to June 30					July 1 to December 31						
	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percent- age of time wells produced	Average number of producing wells— actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percent- age of time wells produced
				Oil	Water					Oil	Water	
Distr. 1—Beverly Hills	11	51,153	1,719	29.8	23.9	86.3	12	53,683	1,836	29.2	24.3	83.2
Brea-Orinda	329	1,832,909	53,866	34.0	14.0	90.5	342	1,803,801	57,927	31.1	14.3	92.1
Coyote Hills	117	2,205,650	17,343	127.2	42.5	81.9	138	2,305,885	21,548	107.0	51.6	84.9
Dominguez	86	3,666,032	13,284	276.0	46.6	85.3	94	4,247,626	15,754	269.6	36.9	91.1
Huntington Beach	486	7,180,260	74,312	96.6	57.4	84.5	499	7,557,381	81,112	96.9	55.8	88.3
Inglewood	202	1,910,010	27,727	68.9	57.2	75.8	213	2,568,082	29,144	88.1	52.7	74.4
Lawndale	6	23,263	1,047	22.2	46.6	96.4	6	20,808	1,079	19.3	45.1	97.7
Long Beach	1,151	11,841,662	178,728	66.3	80.6	85.8	1,237	13,680,373	209,855	65.2	76.4	92.2
Los Angeles City	82	32,300	14,486	2.2	1.5	97.6	82	34,602	14,483	2.4	1.9	96.0
Montebello	172	1,052,479	27,142	38.8	112.7	87.2	181	1,218,335	28,615	42.6	110.6	85.9
Newhall	77	44,395	12,943	3.4	3.8	92.9	80	46,199	13,789	3.4	5.0	93.7
Playa del Rey	178	2,340,132	27,877	83.9	74.8	86.5	209	3,052,567	35,274	86.5	76.9	91.7
Potrero	12	74,113	1,834	40.4	54.6	84.4	10	60,553	1,740	34.8	48.7	94.6
Richfield	247	1,402,339	38,992	36.0	14.7	87.2	249	1,383,376	41,670	33.2	15.0	91.0
Rosecrans	74	501,983	12,157	41.3	52.2	90.8	76	482,346	12,931	37.3	59.7	92.5
Salt Lake	8	45,499	1,379	33.0	151.6	95.4	8	45,452	1,411	32.2	151.9	95.9
Santa Fe Springs	502	6,836,352	77,598	88.1	80.8	85.2	593	9,187,038	100,228	91.7	81.1	91.9
Seal Beach	105	1,686,112	15,287	110.3	207.1	80.4	104	1,686,465	15,680	107.6	179.2	81.9
Torrance	483	1,217,329	81,023	15.0	4.9	92.7	493	1,255,504	84,274	14.9	5.3	92.9
Whittier	162	182,094	26,270	6.9	15.9	89.6	158	194,252	27,144	7.2	17.0	93.4
Los Angeles County	1	6,542	170	38.5	0	93.9	3	32,861	431	76.2	15.5	78.1
Totals	4,491	44,132,608	705,184	62.6	55.9	86.8	4,787	51,217,189	795,925	64.3	55.6	90.4
Distr. 2—Bardsdale	110	83,398	15,793	5.3	1.3	79.3	115	101,760	13,682	7.4	2.0	64.7
Conejo	31	930	5,611	0.2	0.7	100.0	21	500	3,700	0.1	0.7	95.8
Ojai	61	28,140	10,497	2.7	3.9	95.1	62	29,052	10,478	2.8	5.7	91.8
Piru	84	91,656	13,595	6.7	7.5	89.4	85	149,341	13,906	10.7	6.2	88.9
Rincon	34	403,738	4,451	90.7	36.2	72.3	38	561,256	5,936	94.6	22.4	84.9
Santa Paula	45	19,881	5,985	3.3	4.2	73.5	45	19,333	6,149	3.1	4.1	74.3
Sespe	22	3,412	17.1	1.1	1.1	85.7	20	54,506	3.26	16.7	2.0	88.6
Simi	54	22,585	9,657	2.3	0.7	98.8	51	20,737	9,104	2.3	0.7	97.0
South Mountain	78	361,511	10,886	33.2	1.0	77.1	78	344,167	10,115	33.7	1.1	71.2
Ventura	194	4,427,324	27,712	159.8	26.3	78.9	228	6,555,189	35,700	183.6	37.0	85.1
Totals	713	5,497,457	107,599	51.1	10.3	83.4	743	7,835,841	112,132	69.9	15.0	82.0

Dist. 3--Arroyo Grande	14	18,072	2,414	7.5	4.0	95.3	15	47,376	2,366	20.0	2.0	85.7
	15	189,109	1,501	126.0	6.0	53.3	14	332,445	1,931	172.2	4.8	75.0
	8	21,752	1,108	19.6	42.9	76.5	11	39,905	1,162	34.3	31.1	57.4
	6	60,676	923	65.7	27.7	85.0	8	81,454	1,403	58.1	31.1	95.3
	45	1,925,090	6,296	305.8	132.7	77.3	60	2,634,816	9,304	283.2	117.2	84.3
	16	0	0	0	0	0	13	0	0	0	0	0
	La Goleta Gas						6	56,972	752	75.8	53.5	68.1
	4	31,542	285	110.7	74.5	39.4	6	457,886	10,257	44.6	91.1	88.5
	Lompoc						63	532,475	20,528	25.9	37.5	78.0
	Mesa	654,447	7,679	85.2	35.7	70.7	143	4,718	1,354	3.5	0	81.8
	Santa Maria	615,305	19,828	31.0	0	82.2	9	6,303	1,155	5.5	19.0	89.7
	Sargent	4,105	1,190	3.4	23.1	87.8	7	0	0	0	0	0
	Summerland	8,153	1,113	7.3	5.7	12.7	0	0	0	0	0	0
	Santa Barbara County	738	23	32.1	5.7	12.7	0	0	0	0	0	0
Totals-----												
Dist. 4--Belridge	308	3,528,989	42,360	83.3	53.3	76.0	336	4,194,350	50,212	83.5	58.8	81.2
	200	1,532,372	33,975	45.1	11.1	93.9	237	2,069,521	39,901	51.9	10.1	91.5
	21	0	0	0	0	0	128	0	0	0	0	0
	Buttonwillow Gas						2	5,510	138	39.9	15.7	37.5
	5	8,044	711	11.3	3.6	78.6	46	696,030	6,277	110.9	10.4	74.2
	Edison	242,851	2,194	110.7	17.5	48.5	183	1,765,265	30,349	58.2	93.0	90.1
	Elk Hills	1,447,696	25,718	56.3	102.0	78.5	20	0	0	0	0	0
	0	0	0	0	0	0	81	1,138,065	12,913	88.1	7.0	86.6
	Fruitvale	719,568	9,576	75.1	8.1	73.5	1,554	2,473,419	264,094	9.4	26.1	92.4
	Kern River	1,988,788	249,281	8.0	22.2	90.5	341	877,218	58,312	15.0	34.5	92.9
	Lost Hills	855,190	53,837	15.9	31.1	87.5	233	758,301	40,189	18.9	109.4	93.7
	McKittrick						2,631	10,680,189	428,775	24.9	28.2	88.6
	212	624,547	34,267	18.2	107.7	89.3	13	0	0	0	0	0
	Temblor						202	3,101,329	30,502	101.7	76.5	82.1
	Midway-Sunset	9,591,853	394,671	24.3	28.9	84.9	99	6,564,236	15,057	436.0	9.0	82.7
	17	0	0	0	0	0	21	0	0	0	0	0
	Midway-Sunset	2,274,128	22,802	99.7	84.2	75.0	16	203,453	2,063	98.6	17.8	70.1
	Mt. Poso	2,578,041	9,509	271.1	7.1	77.3	72	1,388,608	10,743	129.3	168.0	81.1
	Mountain View						11	0	0	0	0	0
	Mountain View	0	0	0	0	0	34	74,992	6,095	12.3	3.0	97.4
	Poso Creek	53,697	654	82.1	17.0	60.2	42	2,023	82	24.7	2.2	22.3
	Round Mountain	931,248	7,918	117.6	193.4	74.1	14	0	0	0	0	0
	0	0	0	0	0	0	3	1,957	357	5.5	243.1	64.7
	Semitropic Gas						10	0	0	0	0	0
	34	76,821	6,039	12.7	3.1	98.1						
	Wheeler Ridge	478	25	19.1	1.9	13.8						
	Kern County											
	26	0	0	0	0	0						
	Kern County											
	1	751	119	6.3	6.5	65.7						
	Tulare County											
	0	0	0	0	0	0						
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TABLE G. Production Statistics and Operating Data of California Oil Fields—1935—Continued

Field	January 1 to June 30						July 1 to December 31					
	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percent- age of time wells produced	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percent- age of time wells produced
				Oil	Water					Oil	Water	
DIST. 5—Coalinga.....	991	3,455,871	156,920	22.0	14.8	87.5	986	3,792,274	166,516	22.8	14.0	91.8
Kettleman Mid- dle Dome.....	1	31,736	144	220.4	108.9	79.6	1	6,779	30	226.0	137.3	16.3
Kettleman North Dome.....	102	11,106,135	12,525	886.7	83.9	67.8	111	16,454,437	15,907	1,034.4	95.1	77.9
Kings County: Dudley Ridge.....	21	0	0	0	0	0	21	0	0	0	0	0
Madera County: Chowchilla Area.....	0	0	0	0	0	0	21	0	0	0	0	0
San Joaquin County: Tracy Area.....	0	0	0	0	0	0	21	0	0	0	0	0
Totals.....	1,094	14,593,742	169,589	86.1	20.0	85.6	1,098	20,253,490	182,453	111.0	21.1	90.3
Grand totals.....	12,067	90,678,869	1,876,028	48.3	40.1	85.9	12,700	115,300,986	2,086,569	55.3	41.2	89.3

¹ Gas wells omitted from totals.² Wells produced for 23 days in January and were then closed in.³ Two wells producing a total of 25 days.⁴ Two wells producing a total of 82 days.

CHAPTER THREE

METALS

Bibliography: Reports of State Mineralogist I-XXXII (inc.). Bulletins 5, 6, 18, 23, 27, 36, 50, 57, 76, 78, 85, 92, 95, 108. Spurr and Wormser, "Marketing of Metals and Minerals." See also under each metal.

The total value of metals produced in California during 1935 was \$33,198,767. Chief among these is and always has been gold; followed by silver, quicksilver, tungsten ore, iron ore, copper, zinc, lead, platinum.

A comparison of the 1934 output with that of the 1935 output is afforded by the following table:

Substance	1934		1935		Increase + Decrease— Value
	Amount	Value	Amount	Value	
Chromite.....	294 tons	\$3,498	523 tons	\$6,111	\$2,613
Copper.....	590,638 lbs.	47,252	2,031,836 lbs.	168,645	121,393
Gold.....	719,084 fine ozs.	25,131,284	890,430 fine ozs.	31,165,050	6,033,766
Lead.....	804,911 lbs.	29,782	1,142,405 lbs.	45,695	15,913
Platinum metals.....	520 ozs.	14,884	147 ozs.	4,152	10,732—
Quicksilver.....	7,946 flasks	534,135	9,353 flasks	628,590	94,455
Silver.....	844,413 fine ozs.	545,883	1,191,112 fine ozs.	856,112	310,229
Tungsten.....	261 tons	224,417	118 tons	194,542	29,875—
Zinc.....	721,719 lbs.	31,034	328,013 lbs.	14,432	16,602—
Unapportioned.....		^a 53,974		^b 115,438	61,464
Total values.....		\$26,616,143		\$33,198,767	
Net increase.....					\$6,582,624

^a Includes iron ore, manganese ore and molybdenum ore.

^b Includes iron and manganese ores.

ALUMINUM

Bibliography: Report XVIII, p. 198. Bulletins 38, 67. U. S. Geol. Surv., Min. Res. of U. S.

To date there has been no commercial production of aluminum ore in California. Only a single authenticated occurrence of bauxite has thus far been noted in this state, being in Riverside County southeast of Corona, but as yet undeveloped.

ANTIMONY

Bibliography: State Mineralogist Reports VIII, X, XII-XV (inc.), XVII, XXII, XXIII, XXV-XXVII (inc.), XXXI. Bulletins 38, 91.

During 1935 there were no shipments of antimony ore in California. The principal commercial production of antimony in California has come from Kern, Inyo and San Benito counties, and other occurrences have been noted in Nevada, Riverside, San Bernardino and Santa Clara counties. The commonest occurrence is in the form of the sulphide, stibnite; but in the Kernville and Havilah districts in Kern

County there were notable deposits of the native metal, being among the few localities of the world where native antimony has been found.

Present New York quotations (Aug. 8, 1935) are around 12¼¢ per pound for Chinese (duty paid) and American spot antimony.

Antimony Production in California, by Years.

The production of antimony ore in California by years since 1887 has been as follows:

Year	Tons	Value	Year	Tons	Value
1887.....	75	\$15,500	1902.....		
1888.....	100	20,000	1915.....	510	\$35,666
1889.....			1916.....	1,015	64,793
1893.....	50	2,250	1917.....	158	18,786
1894.....	150	6,000	1918.....		
1895.....	33	1,485	1925.....	*26	770
1896.....	17	2,320	1926.....		
1897.....	20	3,500	1927.....	20	590
1898.....	40	1,200	1928.....	20	761
1899.....	75	13,500	1929.....		
1900.....	70	5,700			
1901.....	50	8,350	Totals.....	2,429	\$201,171

* Annual details concealed under 'Unapportioned.'

ARSENIC

Bibliography: Reports XVIII, XXIII, XXV, XXX. Bulletin 67. U. S. G. S., Min. Res. of U. S.

Arsenic is found in a number of localities in California in the mineral arsenopyrite (FeAsS), which is frequently gold bearing; and in scorodite ($\text{FeAsO}_4 + 2\text{H}_2\text{O}$), an oxidation product of arsenopyrite. The occurrence of realgar (AsS) has also been noted.

Except for a small output in 1924, there has been no commercial recovery of arsenic from California ores. There having been only a single operator, the figures are concealed under the 'Unapportioned' item.

BERYLLIUM

Bibliography: State Mineralogist Report XXVII. Eng. & Min. Jour.-Press, Vol. 118, No. 8, p. 285, Aug. 23, 1924. U. S. Bureau of Mines Information Circular 6190.

Beryllium is a metal resembling aluminum closely in its chemical character. It has a specific gravity of 1.85, is almost as hard as quartz (will scratch glass) and will take a high polish. The use of beryllium as a metal is still more or less in the experimental stage because the cost of extracting the metal from its ores almost makes it prohibitive and the present sources of supply of the ore are limited. Not until such a time when deposits can be found that will assure a definite supply and metallurgical costs are such as to justify its use, will the metal be found in common use.

There are a number of beryllium minerals, but none have been found in commercial quantities, except beryl, which is a beryllium-aluminum silicate. The chief use at present for ground beryl is as an addition to porcelain products, where it reduces the coefficient of expansion. Beryllium metal is difficult to separate from aluminum.

Present (Feb. 25, 1937) quotations for beryllium ore are per ton in earload lots, minimum 10 per cent BeO \$30; minimum 12 per cent BeO, \$35, f.o.b. mine.

Beryl occurs in California in the pegmatite dikes of the tourmaline gem district in northern San Diego and northwestern Riverside counties; and an occurrence has recently been noted in western Inyo County, but the quantity is as yet unproved. Thus far there have been no commercial shipments of beryl from California except for gem purposes (the pink and aquamarine varieties).

BISMUTH

Bibliography: Bulletins 38, 67, 91. Am. Jour. Sci., 1903, Vol. 16.

Several bismuth minerals have been found in California, notably native bismuth and bismite (the ochre) in the tourmaline gem district in San Diego and Riverside counties near Pala. Other occurrences of bismuth minerals, including the sulphide, bismuthinite, have been noted in Inyo, Fresno, Nevada, Tuolumne, San Bernardino, and Mono counties, but only in small quantities. The only commercial production recorded was 20 tons valued at \$2,400 in 1904, and credited to Riverside County.

The present quotation (Feb. 25, 1937) for bismuth is \$1.00 per pound, in ton lots for the refined metal.

CADMIUM

Bibliography: U. S. Geol. Surv., Min. Res. of U. S., 1908, 1918.

During 1917 and 1918, cadmium metal was recovered by the electrolytic zinc plant of the Mammoth Copper Company in Shasta County. It was shipped in the form of 'sticks' and amounted to a total of several thousand pounds for the two years, the exact figures being concealed under 'Unapportioned.' That was the first, and thus far the only, commercial production of cadmium recorded from Californian ore. Cadmium occurs there associated with zinc sulphide, sphalerite. Cadmium also occurs in the Cerro Gordo Mines, Inyo County, associated with smithsonite (zinc carbonate).

The present quotation (Feb. 25, 1937) for cadmium is 75¢ to \$1.00 per pound for the refined metal.

CHROMITE

Bibliography: State Mineralogist Reports IV, XII, XIII, XIV, XV, XVII, XVIII, XXI-XXIX (inc.), XXXI, XXXII. Bulletins 38, 76, 91. Preliminary Report 3. U. S. G. S., Bull. 430. Min. & Sci. Press, Vol. 114, p. 552.

During the year 1935 there were shipments of chromite or chromic iron ore in California amounting to 488 short tons, recalculated to a basis of 45% Cr₂O₃, valued at \$6,111 f.o.b. shipping point, and came from Fresno, Napa, Placer, San Luis Obispo, and Shasta counties. This was all material that had been mined in past years but not sold until 1935. The 1935 shipments showed an increase in both amount and value over those of 1934 which were 294 tons worth \$3,498.

Occurrence.

Chromite is widely distributed in California, the principal production, thus far, having come from El Dorado, San Luis Obispo, Del Norte, Shasta, Siskiyou, Placer, Fresno, and Tuolumne counties. In 1918 a total of 29 counties contributed to the State's output. There are two main belts in California yielding this mineral, one along the Coast Ranges from San Luis Obispo County to the Oregon line, including the Klamath Mountains at the north end, and the other in the Sierra Nevada from Tulare County to Plumas County. Chromite occurs as lenses in basic igneous rocks such as peridotite and pyroxenite, and in serpentines which have been derived by alteration of such basic rocks.

Imports.

Imports during 1935 to the United States, of foreign chromite¹ duty free, mainly from Rhodesia, New Caledonia and India, totaled 253,946 long tons valued at \$3,538,380 for the year 1935, compared with 190,797 tons worth \$2,250,787.

Total Chromite Production of California.

Production of chromite in California began, apparently, about 1874, principally in San Luis Obispo County. There was considerable activity from 1880 to 1883, inclusive, and a total of 23,238 long tons (or 26,028 short tons), valued at \$329,924, was shipped from that county up to the beginning of 1887. Some ore also was shipped from the Tyson properties in Del Norte County. The tabulation herewith shows the output of chromite in California, annually, including the earliest figures so far as they are available. The figures from 1887 to date are from the records of the State Mining Bureau:

Year	Tons	Value	Year	Tons	Value
1874-1876 (San Luis Obispo County).....	26,028	\$329,924	1911.....	935	\$14,197
1887.....	3,000	40,000	1912.....	1,270	11,260
1888.....	1,500	20,000	1913.....	1,180	12,700
1889.....	2,000	30,000	1914.....	1,517	9,434
1890.....	3,599	53,985	1915.....	3,725	38,044
1891.....	1,372	20,580	1916.....	48,943	717,244
1892.....	1,500	22,500	1917.....	52,379	1,130,298
1893.....	3,319	49,785	1918.....	73,955	3,649,497
1894.....	3,680	39,980	1919.....	*4,314	97,164
1895.....	1,740	16,795	1920.....	1,770	43,031
1896.....	786	7,775	1921.....	347	6,870
1897.....	-----	-----	1922.....	379	6,334
1898.....	-----	-----	1923.....	84	1,658
1899.....	-----	-----	1924.....	350	6,700
1900.....	140	1,400	1925.....	191	3,712
1901.....	130	1,950	1926.....	393	7,063
1902.....	315	4,725	1927.....	225	5,063
1903.....	150	2,250	1928.....	729	15,179
1904.....	123	1,845	1929.....	327	5,025
1905.....	40	600	1930.....	84	1,905
1906.....	317	2,859	1931.....	441	6,737
1907.....	302	6,040	1932 ^a	1,206	16,587
1908.....	350	6,195	1933 ^a	294	3,498
1909.....	436	5,309	1934.....	488	6,111
1910.....	749	9,707	1935.....	-----	-----
			Totals.....	247,104	\$6,490,065

* Recalculated to 45% Cr₂O₃, beginning with 1919.

^a Annual details concealed under 'Unapportioned.'

¹ Monthly Summary of Foreign Commerce of U. S. Bureau of Foreign and Domestic Commerce, Dec., 1935.

COBALT

Bibliography: Report XIV. Bulletins 67, 91. U. S. G. S., Min. Res. of U. S., 1912, 1918. U. S. B. M., I. C. 6331.

Occurrences of some of the cobalt minerals have been noted in several localities in California, but to date no commercial production has resulted. Some of the copper ores of the foothill copper belt in Mariposa and Madera counties have been found to contain cobalt up to 3%.

The nominal quotation for cobalt is around 97 to 99¢ at \$2.50 per pound for the refined metal—30% for cash.

COPPER

Bibliography: State Mineralogist Reports VIII-XXXII (inc.). Bulletins 23, 50, 91.

The output of copper in California during 1935 amounted to a total of 2,031,836 pounds recoverable metal valued at \$168,645. This was an increased amount and value over the 1934 production which was 590,638 pounds worth \$47,252. The average price of copper in 1935 was 8.3¢ per pound compared with 8.0¢ in 1934; 6.4¢ in 1933; 6.3¢ in 1932; 9.1¢ in 1931; and 13.0¢ in 1930.

Copper was second to gold among the metals in California from 1896 to 1932, when it was passed in output by quicksilver and silver, and in 1933 also by tungsten.

Distribution of the 1935 output of copper in California by counties was as follows:

<i>County</i>	<i>Pounds</i>	<i>Value</i>
Alameda -----	27,104	\$2,250
Amador -----	9,611	800
Butte -----	2,001	166
El Dorado -----	12,391	1,028
Inyo -----	42,589	3,535
Kern -----	37,971	3,152
Los Angeles -----	3,885	322
Mariposa -----	2,252	187
Mono -----	1,295	107
Nevada -----	201,890	16,757
Placer -----	3,178	263
Plumas -----	1,654,113	137,291
Riverside -----	2,073	172
San Bernardino -----	19,553	1,623
Shasta -----	6,178	513
Sierra -----	1,612	134
Alpine, Calaveras, Contra Costa, Fresno, Modoc, Napa, Orange, Sacramento, San Diego, Siskiyou, Trinity, Tuol- umne, Ventura, and Yuba * -----	4,110	345
Totals -----	2,031,836	\$168,645

* Combined to conceal the output of individual producers in each.

According to preliminary data issued by the U. S. Bureau of Mines¹ the smelter production of primary copper from domestic sources during 1935 amounted to 762,587,340 pounds, an increase of approximately 56 per cent compared with 1934 output. The value increased approximately 62 per cent in 1935. The average price of copper delivered during the year, as reported to the U. S. Bureau of Mines by selling agents, was 8.3¢ per pound.

¹ U. S. Bureau of Mines, Mineral Year Book 1936, p. 112.

Copper Production of California, by Years.

Although some mining of copper ores in a small way had been done earlier, shipments in appreciable quantities began in 1861 and continued of importance up to the end of 1867, when a total of 68,631 tons (of 2376 pounds) of high-grade ores, and 847 tons of matte or 'regulus'¹ had been shipped to smelters at New York, Boston, and Swansea, Wales. The most important district at that time was Copperopolis and vicinity in Calaveras County, with some shipments also made from Mariposa, El Dorado, Fresno and San Luis Obispo counties. From 1868 to 1882, the output was insignificant. There are wide discrepancies in the figures current recorded for copper production previous to 1882, in which year the data of the U. S. Geological Survey began. The detailed statistics of the California State Mining Bureau began in the year 1894.

Amount and value of copper production in California annually since 1882 is given in the following tabulation:

Copper Production of California, by Years

Year	Pounds	Value	Year	Pounds	Value
1882.....	826,695	\$144,672	1910.....	53,721,032	\$6,680,641
1883.....	1,600,862	265,743	1911.....	36,838,024	4,604,753
1884.....	876,166	120,911	1912.....	34,169,997	5,638,049
1885.....	469,028	49,248	1913.....	34,471,118	5,343,023
1886.....	430,210	43,021	1914.....	30,491,535	4,055,375
1887.....	1,600,000	192,000	1915.....	40,968,966	7,169,567
1888.....	1,570,021	235,303	1916.....	55,809,019	13,729,017
1889.....	151,505	18,180	1917.....	48,534,611	13,249,948
1890.....	23,347	3,502	1918.....	47,793,046	11,805,883
1891.....	3,397,405	424,675	1919.....	22,162,605	4,122,246
1892.....	2,980,944	342,808	1920.....	12,947,299	2,822,303
1893.....	239,682	21,571	1921.....	12,088,053	1,559,358
1894.....	738,594	72,486	1922.....	22,883,987	3,090,582
1895.....	225,650	21,901	1923.....	28,346,860	4,166,989
1896.....	1,992,844	199,519	1924.....	52,089,349	6,823,704
1897.....	13,638,626	1,540,666	1925.....	46,968,499	6,669,527
1898.....	21,543,229	2,475,168	1926.....	33,521,544	4,693,014
1899.....	23,915,486	3,990,534	1927.....	27,350,316	3,582,888
1900.....	29,515,512	4,748,242	1928.....	25,162,304	3,623,360
1901.....	34,931,788	5,501,782	1929.....	33,809,258	5,941,799
1902.....	27,860,162	3,239,975	1930.....	26,534,752	3,449,522
1903.....	19,113,861	2,520,997	1931.....	12,954,842	1,178,890
1904.....	29,974,154	3,969,995	1932.....	1,417,536	89,307
1905.....	16,997,489	2,650,605	1933.....	992,515	63,521
1906.....	28,726,448	5,522,712	1934.....	590,638	47,252
1907.....	32,602,945	6,341,387	1935.....	2,031,836	168,645
1908.....	40,868,772	5,350,777			
1909.....	65,727,736	8,478,142			
			Totals.....	1,147,188,702	\$182,415,685

GOLD

Bibliography: State Mineralogist Reports I to XXXII (inc.), (except III and VIII). Bulletins 36, 45, 57, 91, 92, 95, 108. U. S. Geol. Surv., Prof. Paper 73. U. S. Bur. of Mines, Econ. Paper 3 (1929).

Gold was first, and, for many years, the most important single mineral product of California. Although now surpassed for a number of years in annual value by petroleum, and by natural gas from 1923 to 1932, it still heads our metal list, and California continues to outrank all the other gold-producing States of the United States, includ-

¹ Brown, J. Ross, Mineral Resources West of the Rocky Mountains, p. 168, 1867.

ing Alaska. In fact, at present, California is producing approximately 28% of the gold mined in the entire United States.

There has been a steady increase in the development of both lode and placer mines in California during the last four or five years, brought about by the present economic conditions. During 1934 there were 2599 operators in California, not including snipers, prospectors and various individuals, selling gold in small lots to the bullion dealers. There was no premium paid on gold during 1932, the price being \$20.67



New steel headframe of Idaho-Maryland Mine, Grass Valley, Nevada County.

Photo by Walter W. Bradley.

a fine ounce. On August 29, 1933, there was an executive order lifting the embargo on gold ores, concentrates, precipitates, and unretorted amalgam, followed on October 25, 1933, by another order instructing the Reconstruction Finance Corporation to buy newly-mined gold at a price fixed by the U. S. Treasurer which corresponded to the world price, all of which had an effect on the 1933 gold yield. On January 30, 1934, the Gold Reserve Act of 1934 was passed, followed by the President's proclamation of January 31, 1934, which fixed the weight

of the gold dollar at 15 5/21 grains, nine-tenths fine. The value of gold thereby became \$35 a fine ounce. The average weighted value of gold per fine ounce in 1934 was \$34.95.

The production of gold in California during 1935 totaled 890,430.00 fine ounces valued at \$31,165,050, being an increase of 17,366.08 fine ounces over the 1934 yield. Deep or lode mines accounted for 544,904 fine ounces worth \$19,071,640, and placers (mainly bucket-line, drag-line and power-shovel dredges) produced 345,536.00 fine ounces worth \$12,093,410.

As the Division of Mines has never independently gathered the statistics of gold and silver production, these figures, as in former years, are published by cooperation with and through the courtesy of Charles White Merrill and H. M. Gaylord of the Division of Mineral Statistics, U. S. Bureau of Mines.

The largest production in 1935 was reported from Nevada County, with an output of 251,002.84 fine ounces (\$8,785,099); Sacramento County second with 113,823.13 fine ounces (\$3,983,985); Amador County third with 74,692.42 fine ounces (\$2,614,235); Yuba County fourth with 51,610.13 fine ounces (\$1,806,355); Eldorado County fifth with 51,524.81 fine ounces (\$1,803,368); followed in turn by Calaveras, Kern, and Merced counties with a combined output worth over a million dollars.

Nevada held the first place as a gold producing county with an output exceeding that of Yuba or Amador which held first and second places respectively in 1928 with Sacramento fourth that year. Sacramento held second place since 1931, its output exceeding that of Amador, which held second place in 1930. The gold from Yuba and Sacramento comes almost entirely from dredges, while that from Nevada and Amador counties comes mainly from the lode mines.

Distribution of the 1935 gold output by counties was as follows:

County	NUMBER OF OPERATORS ^a		Value
	Lode	Placer	
Alameda	1	--	
Alpine	1	--	\$280
Amador	52	35	2,614,235
Butte	29	76	952,632
Calaveras	58	55	1,607,242
Colusa	1	--	938
Del Norte	1	9	4,798
El Dorado	63	227	1,803,368
Fresno	10	10	20,645
Glenn	--	--	2
Humboldt	--	31	31,677
Imperial	12	4	59,406
Inyo	78	9	656,339
Kern	143	38	1,391,646
Kings	--	--	83
Lake	--	--	65
Lassen	4	--	12,182
Los Angeles	13	19	219,405
Madera	19	21	21,410
Mariposa	93	43	514,544
Merced	--	4	1,302,369
Modoc	1	--	84
Mono	23	7	39,994
Monterey	2	2	297
Napa	1	--	3,984
Nevada	39	109	8,785,099
Orange	1	--	1,154
Placer	39	115	925,309
Plumas	26	77	207,856
Riverside	39	12	112,057
Sacramento	2	16	3,983,985
San Bernardino	113	36	279,020
San Diego	11	1	10,367
San Joaquin	--	2	99,698
San Luis Obispo	--	--	287
Santa Cruz	2	--	617
Shasta	40	44	962,448
Sierra	20	83	841,218
Siskiyou	54	151	575,676
Sonoma	--	--	317
Stanislaus	--	8	293,129
Sutter	--	--	357
Tehama	--	--	177
Trinity	29	106	727,787
Tulare	2	2	952
Tuolumne	79	92	286,062
Ventura	4	--	6,783
Yolo	--	1	715
Yuba	7	42	1,806,355
* Totals	1,112	1,487	\$31,165,050

^a Number does not include snipers, prospectors, and various individuals selling small lots to bullion dealers.

The following is quoted from the advance statement of gold in 1935 by courtesy of the U. S. Bureau of Mines,^b Department of Commerce:

"Gold—The production of recoverable gold in California in 1935 is estimated at 890,430 fine ounces valued at \$31,165,050, an increase of 24 per cent in quantity and value over 1934. Exact figures are not available on the proportionate contributions of lode and placer mines, but enough data have been collected to indicate substantial increases from both sources. In 1934 lode mines accounted for approximately 62 per cent of the State yield; the remaining 38 per cent came from placers. Nevada County continued to be the principal producer of gold in 1935; the bulk of its production came from the lode mines of the Grass Valley-Nevada City district. Sacramento County was the second largest producer of gold in the State, because of the great productivity of the gold dredges in the Folsom district. The Mother Lode continued to be most productive in Amador County. Dredging, principally along the Yuba River in Yuba County, accounted for much of the large gold production there. El Dorado County derived the most of its gold output from the part of the Mother Lode included within its boundaries. Although the section of the Mother Lode in Calaveras County was the principal contributor to that county's gold output, considerable production also was reported from the lode mines in its East Belt district and from placer operations in the Camanche district. In Kern County the rapidly developing

^b U. S. Bureau of Mines, Mineral Yearbook, 1936, pp. 221-222.

mines in the Mojave district and the rehabilitated properties in the old Randsburg district accounted for the large gold production of the county. Sierra County was important as a producer of gold largely because of the output of the Alleghany district. Among the other large gold-producing counties were Shasta, and Mariposa, which depended chiefly on lode mines for their yield; Merced, Trinity, Butte, and Stanislaus, which derived most of their gold from placer mines; and Siskiyou and Placer Counties, where the production was more evenly divided between lode and placer deposits.

"The following is a list of companies (or mines) operating lode gold mines, arranged roughly in order of their importance as producers: Empire Star Mines Co., Ltd. (Nevada County), Idaho Maryland Mines Corporation (Nevada County), Iron Mountain property of the Mountain Copper Co., Ltd. (Shasta County), Lava Cap Gold Mining Corporation (Nevada County), Argonaut Mining Co., Ltd. (Amador County), Kennedy Mining & Milling Co. (Amador County), Carson Hill Gold Mining Corporation (Calaveras County), Big Canyon Mine of the Mountain Copper Co., Ltd. (El Dorado County), Cardinal Gold Mining Co. (Inyo County), Original Sixteen to One Mine, Inc. (Sierra County), Montezuma Apex Mining Co. (El Dorado County), Tropico mine (Kern County), Central Eureka Mining Co. (Amador County), Golden



Mill and aerial tramway terminal, King Solomon Mine at Black Bear, Siskiyou County.

Photo by Walter W. Bradley.

Center mine (Nevada County), Anglo-American Mining Corporation, Ltd. (Kern County), Middle Fork Gold Mining Co. (El Dorado County), Central Tailings Co. (Amador County), Pacific Mining Co. (Mariposa County), Beebe Gold Mining Co. (El Dorado County), Spanish Mining Co. (Nevada County), Golden Queen Mining Co. (Kern County), Kenton mine (Sierra County), Lucky Boy Mining Co. (Calaveras County), Gold Reserve mine (El Dorado County), Diltz mine (Mariposa County), and Walker mine (Plumas County).

"The following are leading gold producers from placers in California, arranged roughly in order of their output in 1935: Natomas Co. (Sacramento County), Yuba Consolidated Gold Fields (Yuba County), Capital Dredging Co. (Sacramento County), Snelling Gold Dredging Co. (Merced County), Gold Hill Dredging Co. (Sacramento County), La Grange Gold Dredging Co. (Stanislaus County), Arroyo Seco Gold Dredging Co. (Amador County), Yuba Consolidated Gold Fields (Merced County), Merced Dredging Co. (Merced County), Calaveras Central (Calaveras County), Trinity Dredging Co. (Trinity County), Gold Bar Dredging Co. (Trinity County), Cal-Oro Dredging Co. (Siskiyou County), Northern California Mines Co. (Trinity County), Oroville Gold Dredging Co. (Butte County), and Wyandotte Gold Dredging Co. (Butte County).

"Besides these larger mines many smaller producers worked lode and placer properties. Another source of much gold in California was the itinerant miner who usually works property that he does not own. Since the depression many people lacking other employment have panned for gold by hand in the streams of California with the hope of extracting enough to furnish the bare necessities of life. Although the average income of this class of miners has been pitifully small, a few of the more fortunate ones have picked up rich pockets. Exact figures are not available as to the number engaged in itinerant placer mining, but probably more than 10,000 individuals tried this method of solving their personal unemployment problem during the year."

Total Gold Production of California.

The presence of gold in stream gravels near Los Angeles was known and worked in a small way by the Indians, at least as early as 1841,¹ and possibly 1820.² On March 2, 1844, Don Manuel Castanares, deputy for California to the Congress of Mexico, reported³ to his government that placers near Los Angeles had produced up to December, 1843, a total of 2000 ounces of gold dust, most of which had been sent to the United States Mint at Philadelphia.

As the padres and the rancheros discouraged the quest of gold, this early, small production caused no particular excitement. It was not until James W. Marshall's finding of gold nuggets in the tail-race of Sutter's saw mill on the American River, January 24, 1848, was heralded abroad that the great rush began, and California became a commonwealth of first rank almost over night. There are, however, no authentic data on gold production prior to 1848, other than occasional, scattered references such as above quoted.

The following table was originally compiled by Chas. G. Yale, of the Division of Mineral Resources, U. S. Geological Survey, but for a number of years statistician of the California State Mining Bureau and the U. S. Mint at San Francisco. The authorities chosen for certain periods were: J. D. Whitney, State Geologist of California; John Arthur Phillips, author of "Mining and Metallurgy of Gold and Silver" (1867); U. S. Mining Commissioner R. W. Raymond; U. S. Mining Commissioner J. Ross Browne; Wm. P. Blake, Commissioner from California to the Paris Exposition, where he made a report on "Precious Metals" (1867); John J. Valentine, author for many years of the annual report on precious metals published by Wells, Fargo & Company's Express; and Louis A. Garnett, in the early days manager of the San Francisco refinery, where records of gold receipts and shipments were kept. Mr. Yale obtained other data from the reports of the director of the U. S. Mint and the director of the U. S. Geological Survey. The authorities referred to who were alive at the time of the original compilation of this table in 1894 were all consulted in person or by letter by Mr. Yale with reference to the correctness of their published data, and the final table quoted was then made up.

The figures for 1903-1923 (inclusive) are those prepared by the U. S. Geological Survey; and since by the U. S. Bureau of Mines:

¹ Hittell, T. H., *History of California*, Vol. II, p. 312, 1885.

² Bancroft, H. H., *History of California*, Vol. II, p. 417, 1886.

³ *Mercantile Trust Review of the Pacific*, Vol. XIV, No. 2, p. 43, Feb. 15, 1925.

Total Gold Production of California

Year	Value	Year	Value
1848.....	\$245,301	1893.....	\$12,538,780
1849.....	10,151,360	1894.....	13,863,282
1850.....	41,273,106	1895.....	15,334,317
1851.....	75,938,232	1896.....	17,181,562
1852.....	81,794,700	1897.....	15,871,401
1853.....	57,613,487	1898.....	15,906,478
1854.....	69,433,931	1899.....	15,336,031
1855.....	55,485,395	1900.....	15,863,355
1856.....	57,509,411	1901.....	16,989,044
1857.....	43,628,172	1902.....	16,910,320
1858.....	46,591,140	1903.....	16,300,653
1859.....	45,846,599	1904.....	18,633,676
1860.....	44,095,163	1905.....	18,898,545
1861.....	41,884,995	1906.....	18,732,452
1862.....	28,854,668	1907.....	16,727,928
1863.....	23,501,736	1908.....	18,761,559
1864.....	24,071,423	1909.....	20,237,870
1865.....	17,930,858	1910.....	19,715,440
1866.....	17,123,867	1911.....	19,738,908
1867.....	18,265,452	1912.....	19,713,478
1868.....	17,555,867	1913.....	20,406,958
1869.....	18,229,044	1914.....	20,653,496
1870.....	17,458,133	1915.....	22,442,296
1871.....	17,477,885	1916.....	21,410,741
1872.....	15,482,194	1917.....	20,087,504
1873.....	15,019,210	1918.....	16,528,953
1874.....	17,264,836	1919.....	16,695,955
1875.....	16,876,009	1920.....	14,311,043
1876.....	15,610,723	1921.....	15,704,822
1877.....	16,501,268	1922.....	14,670,346
1878.....	18,839,141	1923.....	13,379,013
1879.....	19,626,654	1924.....	13,150,175
1880.....	20,030,761	1925.....	13,065,330
1881.....	19,223,155	1926.....	11,923,481
1882.....	17,146,416	1927.....	11,671,018
1883.....	24,316,873	1928.....	10,785,315
1884.....	13,600,000	1929.....	8,526,703
1885.....	12,661,044	1930.....	9,451,162
1886.....	14,716,506	1931.....	10,814,162
1887.....	13,588,614	1932.....	11,765,726
1888.....	12,750,000	1933.....	^a 15,683,075
1889.....	11,212,913	1934.....	^b 25,131,284
1890.....	12,309,793	1935.....	^c 31,165,050
1891.....	12,728,869		
1892.....	12,571,900	Total value.....	\$1,936,215,491

^a Value calculated at an average weighted price of \$25.56 per fine ounce ; previously \$20.6718.

^b Value calculated at an average weighted price of \$34.95 per fine ounce.

^c Value \$35 per fine ounce.

IRIDIUM (see under Platinum)

IRON ORE

Bibliography: State Mineralogist Reports II, IV, V, X, XII-XV (inc.), XVII, XVIII, XXI-XXVII (inc.), XXX, XXXI. Bulletins 38, 67, 91. Am. Inst. Min. Eng., Trans. LIII. Min. & Sci. Press, Vol. 115, pp. 112, 117-122; Vol. 123, pp. 94-96, 113-114.

During 1935 there were two shipments of iron ore in California, which came from San Bernardino County. The material mined in 1934 came from a single producer each in San Bernardino and Santa Cruz counties. That coming from the first named county was hematite and used in the manufacture of high-iron cement, the latter produced magnetite. The annual details are combined under the 'Unapportioned' item to conceal the output of either operator. There are considerable deposits of iron ore known in California, notably in Shasta, Madera, Placer, Riverside, San Bernardino, and Los Angeles counties, but production has so far been limited for lack of an economic supply

of coking coal. Some pig iron has been made, utilizing charcoal for fuel, both in blast furnaces and by electrical reduction; also, ferrochrome, ferromanganese, and ferrosilicon have been made in California.

Iron Ore Production in California, by Years.

Total iron ore production of California, with annual amounts and values, is as follows:

Year	Tons	Value	Year	Tons	Value
1881*	9,273	\$79,452	1917	2,874	\$11,496
1882	2,073	17,766	1918	3,108	15,947
1883	11,191	106,540	1919	2,300	13,796
1884	4,532	40,983	1920	5,975	40,889
1885			1921	1,970	12,030
1886	3,676	19,250	1922	3,588	18,868
1887			1923	3,102	18,665
1893	250	2,000	1924 ^a		
1894	200	1,500	1925 ^a	785	4,710
1895			1926 ^a		
1907	400	400	1927 ^a	5,272	26,000
1908			1928		
1909	108	174	1930 ^a	100	700
1910	579	900	1931		
1911	558	558	1932		
1912	2,508	2,508	1934 ^a		
1913	2,343	4,485	1935	38,339	163,714
1914	1,436	5,128			
1915	724	2,584	Totals	110,244	\$717,043
1916	3,000	6,000\$			

* Productions for the years 1881-1886 (inc.) were reported as "tons of pig iron" (U.S.G.S., Min. Res. 1885), and for the table herewith are calculated to "tons of ore" on the basis of 47.6% Fe as shown by an average of analyses of the ores (State Mineralogist Report IV, p. 242). This early production of pig iron was from the blast furnaces then in operation at Hotaling in Placer County. Charcoal was used in lieu of coke. Though producing a superior grade of metal, they were obliged finally to close down, as they could not compete with the cheaper English and eastern United States iron brought in by sea to San Francisco.

^a Annual details concealed under 'Unapportioned.'

LEAD

Bibliography: State Mineralogist Reports IV, VIII-XV (inc.), XVII-XXVIII (inc.), XXX, XXXI.

The production of lead in California during 1935 amounted to a total of 1,142,405 pounds of recoverable metal valued at \$45,695, as compared with the 1934 figures of 804,911 pounds worth \$29,782. The average price of lead in 1935 was 4.0¢ per pound, compared with 3.7¢ per pound in 1934, 3.7¢ per pound in 1933, 3.0¢ per pound in 1932, 3.7¢ per pound in 1931, and 5.0¢ per pound in 1930.

Distribution of 1935 output of lead by counties was as follows:

County	Pounds	Value
Amador	3,271	\$131
Inyo	578,583	23,142
Kern	2,180	87
Mariposa	1,438	57
Mono	6,305	252
Nevada	355,526	14,221
Orange	39,981	1,599
Plumas	1,331	53
Riverside	15,393	616
San Bernardino	123,776	4,951
San Diego	8,323	333
Shasta	1,747	70
Alpine, Butte, Calaveras, Contra Costa, El Dorado, Lassen, Los Angeles, Merced, Placer, Shasta, Sierra, Trinity, Tuolumne ^a	5,551	182
Totals	1,142,405	\$45,695

^a Combined to conceal the output of individual operators in each.

Lead Production of the United States.

According to preliminary data issued by the U. S. Bureau of Mines¹ during 1935, the production of primary lead in the United States was 310,505 short tons, valued at \$24,840,000, being an increase over the national production of 1934 which was 299,481 short tons worth \$22,188,000.

Lead Production of California, by Years.

Statistics on lead production in California were first compiled by this Bureau in 1887. Amount and value of the output, annually, with total figures, to date, are given in the following table:

Lead Production in California, by Years

Year	Pounds	Value	Year	Pounds	Value
1877.....	^a 7,836,000	\$391,800	1907.....	328,681	\$16,690
1878.....	8,640,000	328,320	1908.....	1,124,483	46,663
1879.....	4,502,000	191,335	1909.....	2,685,477	144,897
1880.....	4,200,000	215,460	1910.....	3,016,902	134,082
1881.....	6,680,000	325,316	1911.....	1,403,839	63,173
1882.....	^b 4,000,000	196,800	1912.....	1,370,067	61,653
1883.....	^c 3,400,000	145,520	1913.....	3,840,951	160,202
1884.....	3,200,000	120,512	1914.....	4,697,400	183,198
1885.....	2,000,000	80,900	1915.....	4,796,299	225,426
1886.....	2,000,000	93,400	1916.....	12,392,031	855,049
1887.....	^d 1,160,000	52,200	1917.....	21,651,352	1,862,016
1888.....	900,000	38,250	1918.....	13,464,869	956,006
1889.....	940,000	35,720	1919.....	4,139,562	219,397
1890.....	800,000	36,000	1920.....	4,903,738	392,300
1891.....	1,140,000	49,020	1921.....	1,149,051	51,707
1892.....	1,360,000	54,400	1922.....	6,511,280	358,120
1893.....	666,000	24,975	1923.....	9,934,522	695,416
1894.....	950,000	28,500	1924.....	4,984,387	398,751
1895.....	1,592,400	49,364	1925.....	7,352,422	639,661
1896.....	1,293,500	38,805	1926.....	8,067,873	645,429
1897.....	596,000	20,264	1927.....	2,748,440	173,151
1898.....	655,000	23,907	1928.....	1,882,795	109,102
1899.....	721,000	30,642	1929.....	1,428,777	90,014
1900.....	1,040,000	41,600	1930.....	3,542,796	176,241
1901.....	720,500	28,820	1931.....	3,934,240	145,568
1902.....	349,440	12,230	1932.....	2,418,626	72,480
1903.....	110,000	3,960	1933.....	772,463	28,583
1904.....	124,000	5,270	1934.....	804,911	29,655
1905.....	533,680	25,083	1935.....	1,142,405	45,695
1906.....	338,718	19,307			
			Totals.....	198,738,877	\$11,688,005

^a Quantities for 1877-1881 (inc.) from C. E. Siebenthal, Mineral Resources of U. S. 1912, Part I, U. S. Geol. Survey, p. 339; and values for same years from quotations in Eng. & Min. Jour. of New York.

^b Estimated.

^c Quantities and values for 1883-1886 (inc.) from Mineral Resources of U. S. Geol. Surv., 1883-1886, respectively.

^d Data from 1887 to date from reports of California State Mining Bureau.

MANGANESE

Bibliography: State Mineralogist Reports XII-XV (inc.), XVIII, XXII-XXVII (inc.), XXIX-XXXI. Bulletins 38, 67, 76, 91. U. S. G. S. Bull. 427. Eng. & Min. Jour.-Press, Vol. 117, p. 545.

During 1935 in California there were shipments of manganese ore coming from a single property in Riverside County; these shipments were consumed in the steel mills of the State. The material shipped in 1934 came from a single property each in Lake, Riverside, and San

¹ U. S. Bureau of Mines Mineral Market Report 455, May 19, 1936.

Bernardino counties. The annual details are concealed under the 'Unapportioned' item as one operator made all the shipments.

Imports of foreign manganese ore into the United States¹ during 1935, mainly from Soviet Russia, Gold Coast, Cuba, and Brazil, amounted to 383,498 long tons of ore containing 189,254 long tons of manganese valued at \$4,208,673, as compared with 341,339 long tons containing 165,840 long tons of manganese worth \$3,529,182.

The Tariff Act of 1930 provides for an import duty of 1¢ per pound on the metallic manganese contained, for "manganese ore (including ferruginous manganese ore) or concentrates containing in excess of 10 per centum of metallic manganese."

Manganese Ore Production in California, by Years.

Production of manganese ore in California began at the Ladd Mine, San Joaquin County, in the Tesla District in 1867. When shipments of this ore to England ceased late in 1874, upwards of 5000 tons had been produced by that property. For some years following that, the output was small. The tabulation herewith shows California's output of manganese ore, annually, since 1887, when the compilation of such figures was begun by the State Mining Bureau:

Year	Tons	Value	Year	Tons	Value
1887.....	1,000	\$9,000	1912.....	22	\$400
1888.....	1,500	13,500	1913.....		
1889.....	53	901	1914.....	150	1,500
1890.....	386	3,176	1915.....	4,013	49,098
1891.....	705	3,830	1916.....	13,404	274,601
1892.....	300	3,000	1917.....	15,515	396,659
1893.....	270	4,050	1918.....	26,075	979,235
1894.....	523	5,512	1919.....	11,569	451,422
1895.....	880	8,200	1920.....	2,892	62,323
1896.....	518	3,415	1921.....	1,005	12,210
1897.....	504	4,080	1922.....	540	7,650
1898.....	440	2,102	1923.....	690	10,620
1899.....	295	3,165	1924.....	1,115	25,785
1900.....	131	1,310	1925.....	832	19,450
1901.....	425	4,405	1926.....	235	4,700
1902.....	870	7,140	1927.....		
1903.....	1	25	1928)*.....		
1904.....	60	900	1929)*.....	733	8,216
1905.....			1930)*.....		
1906.....	1	30	1931)*.....	207	2,576
1907.....	1	25	1932.....		
1908.....	321	5,785	1933)*.....		
1909.....	3	75	1934)*.....	432	4,630
1910.....	265	4,235	1935.....		
1911.....	2	40	Totals.....	88,883	\$2,398,976

* Annual details concealed under 'Unapportioned.'

MOLYBDENUM

Bibliography: State Mineralogist Reports XIV, XVII-XXIV (inc.), XXVI-XXVIII (inc.), XXX. Bulletins 67, 91. U. S. Bur. of Min., Bulletin 111. Proc. Colo. Sci. Soc., Vol. XI.

Molybdenum is used as an alloy constituent in the steel industry, and in certain forms of electrical apparatus. Included in the latter is its successful substitution for platinum and platinum-iridium in electric contact-making and -breaking devices. In alloys it is used similarly to and in conjunction with chromium, cobalt, iron, manganese, nickel, tungsten, and vanadium. The oxides and the ammonium salt have important chemical uses.

¹ U. S. Bureau of Foreign and Domestic Commerce, Monthly Summary, Dec., 1934.

The two principal molybdenum minerals are: the sulphide, molybdenite, and wolfenite, lead molybdate; the former furnishing practically the entire commercial output. Molybdenite is found in or associated with acidic igneous rocks, such as granite and pegmatite.

Deposits of disseminated molybdenite are known in several localities in California, and in at least two places it occurs in small masses associated with copper sulphides. The first recorded commercial shipments of molybdenum ore in California were during the war 1916-1918. Some development work has been recently done on a high-grade deposit at the head of the Kaweah River, Tulare County.

The Tariff Act of 1930 provides for an import duty of 35 cents a pound for the metallic molybdenum content of molybdenum ores or concentrates.

The present (Feb. 25, 1937) quotations on molybdenum ores are 42¢ per pound of MoS_2 contained, delivered at Pittsburgh, Pa., and on ferromolybdenum are 95¢ per pound Mo, 50%-60% Mo f.o.b. shipping point.

During 1935 there was no production of molybdenum ore reported mined in California. In 1933 and 1934 there were shipments of molybdenum concentrates in California amounting to 1432 pounds 91.23% MoS_2 valued at \$306. The annual details are combined under the 'Unapportioned' item to conceal the output of either operator. The material shipped in 1933 came from Inyo County and had been mined for several years, and that shipped in 1934 came from Mono County and was mined in 1933.

Molybdenum Production of California, by Years.

California's production of molybdenum ore by years is summarized in the following tabulation:

Year	Tons	Value
1916 -----	8	\$9,945
1917 -----	243	9,014
1918 -----	*	300
1919 -----	-----	-----
1933 } -----	b	306
1934 } -----	-----	-----
Totals -----	252	\$19,565

* 300 pounds of 90% MoS_2 concentrate.

^ Annual details concealed under 'Unapportioned.'

b 1432 pounds of 91.23% MoS_2 concentrates.

NICKEL

Bibliography: State Mineralogist Reports XIV, XVII, XXIV, XXV, XXVIII, XXX. U. S. G. S., Bulletin 640-D. U. S. Bureau of Standards, Circular 100.

Nickel occurs in the Friday Copper Mine in the Julian District, San Diego County. The ore is a nickel-bearing pyrrhotite, with some associated chalcopyrite. Some ore has been mined in the course of development work but not treated nor disposed of, as they were unable to get any smelter to handle it for them. Nickel ore has also been reported from other localities in California, but not yet confirmed.

Present (Aug. 1, 1935) quotations for nickel are around 35¢-36¢ per pound for the refined metal.

OSMIUM (see under Platinum)

PALLADIUM (see under Platinum)

PLATINUM

Bibliography: State Mineralogist Reports IV, VIII, IX, XII-XXVI (inc.), XXVIII, XXX, XXXI. Bulletins 38, 45, 67, 85, 91, 92. U. S. Geol. Surv., Bulletins 193, 285. Trans. Am. Inst. Min. Eng., Vol. 47, pp. 217-218.

In California the platinum group metals are obtained as a by-product from placer operations for gold. The major portion of it comes from the dredges working in Amador, Butte, Sacramento, Stanislaus, Shasta and Yuba counties, with a small amount coming from the hydraulic and surface-sluicing mines of Del Norte, Humboldt, Siskiyou and Trinity counties.

The output of the platinum-group metals in California during 1935 amounted to 536 ounces crude, of which 147 ounces crude containing 121 fine ounces were sold and had a value to the miner of \$4,153. This metal came from properties in Calaveras, Merced, Sacramento, Stanislaus, Trinity, and Yuba counties. The 1934 yield was 520 ounces crude containing 424 fine ounces worth \$14,884 (some of the above material was mined before 1934 but not sold until then). Of the material sold in 1935, 59 fine ounces were platinum; 21 fine ounces, iridium; 24 fine ounces, osmium; and 17 fine ounces, ruthenium. Of the 424 fine ounces sold in 1934, 302 fine ounces were platinum, 45 fine ounces iridium, 50 fine ounces osmium; 25 fine ounces, ruthenium, and 2 fine ounces, palladium.

Prices.

The average prices during 1935 for the various platinum-group metals per fine ounce, according to refiners' reports, as given by the U. S. Bureau of Mines¹ were: platinum, \$32.60; palladium, \$23.25; iridium, \$50.90; osmium, \$51; rhodium, \$44; and ruthenium, \$39, compared with 1934 prices which were: platinum, \$34.50; palladium, \$22.54; iridium, \$74; osmium, \$63; rhodium, \$44.10; and ruthenium, \$37.40.

¹ U. S. Bureau of Mines, Mineral Market Report 379, August 14, 1935.

Platinum Production of California, by Years.

The annual production and values since 1887 have been as follows:

Year	Ounces	Value	Year	Ounces	Value
1887.....	416	\$10,400	1912.....	603	\$19,731
1888.....	100	400	1913.....	368	17,738
1889.....	500	2,000	1914.....	463	14,816
1890.....	500	2,000	1915.....	667	21,149
1891.....	600	2,500	1916.....	886	42,642
1892.....	100	500	1917.....	610	43,719
1893.....	80	440	1918.....	571	42,788
1894.....	75	517	1919.....	•418	60 611
1895.....	100	600	1920.....	477	68,977
1896.....	150	900	1921.....	613	58,754
1897.....	162	944	1922.....	795	90,288
1898.....	150	900	1923.....	602	78,546
1899.....	300	1,800	1924.....	273	36,452
1900.....	300	1,800	1925.....	292	39,937
1901.....	400	2,500	1926.....	322	32,005
1902.....	250	3,200	1927.....	139	10,749
1903.....	39	468	1928.....	312	27,902
1904.....	70	1,052	1929.....	212	14,416
1905.....	123	1,849	1930.....	217	11,700
1906.....	200	3,320	1931.....	305	11,979
1907.....	91	1,647	1932.....	278	8,142
1908.....	300	6,255	1933.....	236	7,255
1909.....	706	13,414	1934.....	424	14,884
1910.....	337	8,386	1935.....	121	4,153
1911.....	511	14,873			
			Totals.....	16,758	\$861,998

• Fine ounces, beginning with 1919.

QUICKSILVER

Bibliography: State Mineralogist Reports IV, V, XII–XV, XVII–XXIX (inc.), XXXI, XXXII. Bulletin 27, 78, 91. U. S. Geol. Surv., Monograph XIII. U. S. Bur. of Mines, Tech. Papers 96, 227; Bulletin 222, 335.

The production of quicksilver in California during the year 1935 amounted to 9353 flasks valued at \$628,590. This was an increase in both amount and value over the 1934 figures which were 7946 flasks worth \$534,135. The distribution of the 1935 output by counties was as follows:

County	Flasks	Value
Lake	4,097	\$285,426
Napa	1,109	60,649
San Benito	791	55,015
San Luis Obispo	2,474	167,613
Santa Barbara	110	7,854
Sonoma	81	5,474
Colusa, Fresno, Inyo, Kings, Monterey, Trinity *	308	20,058
Totals	9,353	\$628,590

* Combined to conceal the output of individual operators in each.

Prices.

During 1935 the average for New York monthly quotations¹ was \$71.992 per 76-lb. flask. The average price for 1934 was \$73.865. The average price for January, 1935 was \$72.76, dropping to \$69 in August and raising to the end of the year with an average for December of \$75.20. The average price received by producers in California during 1935 was \$67.23 per 76-lb. flask, compared with \$67.32 per flask in 1934.

¹ Engineering & Mining Journal Vol. 136, 1935.

The U. S. Bureau of Mines¹ reported the total production of the United States for 1935 at 17,518 flasks valued at \$1,261,121. The national production for 1934 was 15,445 flasks worth \$1,140,845. California was by a considerable margin the largest producing state, with approximately 52 per cent of the total, other producing states being Oregon, Texas, Arkansas, Washington, Nevada, and Arizona. The 1935 imports of quicksilver amounted to 7815 flasks compared with 10,192 flasks in 1934, a decrease of 23 per cent. Of total imports for 1935, Spain supplied 6856 flasks, Italy 904 flasks, and Mexico 55 flasks. Of the 1934 imports, Spain was credited with 7053 flasks, Mexico 2480 flasks, Italy 649 flasks, and Sweden 10 flasks. At the end of 1935 there were 3582 flasks of mercury in bonded warehouses compared with 4346 flasks on hand at the end of 1934.

Total Quicksilver Production of California.

Total amount and value of the quicksilver production of California, as given in available records, are shown in the following tabulation. Though the New Almaden Mine in Santa Clara County was first worked in 1824, and has been in practically continuous operation since 1846 (the yield being small the first two years), there are no available data on the output earlier than 1850. Previous to June, 1904, a 'flask' of quicksilver contained 76½ pounds; then 75 pounds up to and including 1927; beginning with 1928, 76 pounds. In compiling this table the following sources of information were used: for 1850-1883, table by J. B. Randol, in Report of State Mineralogist IV, p. 336; 1883-1893, U. S. Geological Survey reports; 1894 to date, statistical bulletins of the State Mining Bureau; also State Mining Bureau, Bulletin 27, "Quicksilver Resources of California," 1908, p. 10.

¹U. S. Bureau of Mines Mineral Market Rept. 467, June 24, 1936.

Year	Flasks	Value	Average price per flask	Year	Flasks	Value	Average price per flask
1850.....	7,723	\$768,052	\$99 45	1894.....	30,416	\$934,000	\$30 70
1851.....	27,779	1,859,248	66 93	1895.....	36,104	1,337,131	37 04
1852.....	20,000	1,166,600	58 33	1896.....	30,765	1,075,449	34 96
1853.....	22,284	1,235,648	55 45	1897.....	26,691	993,445	37 28
1854.....	30,004	1,663,722	55 45	1898.....	31,092	1,188,626	38 23
1855.....	33,000	1,767,150	53 55	1899.....	29,454	1,405,045	47 70
1856.....	30,000	1,549,500	51 65	1900.....	26,317	1,182,786	44 94
1857.....	28,204	1,374,381	48 73	1901.....	26,720	1,285,014	48 46
1858.....	31,000	1,482,730	47 83	1902.....	29,552	1,276,524	43 20
1859.....	13,000	820,690	63 13	1903.....	32,094	1,335,954	42 25
1860.....	10,000	535,500	53 55	1904.....	^a 28,876	1,086,323	37 62
1861.....	35,000	1,471,750	42 05	1905.....	24,655	885,081	35 94
1862.....	42,000	1,526,700	36 35	1906.....	19,516	712,334	36 50
1863.....	40,531	1,705,544	42 08	1907.....	17,379	663,178	38 16
1864.....	47,480	2,179,745	45 90	1908.....	18,039	763,520	42 33
1865.....	53,000	2,432,700	45 90	1909.....	16,217	773,788	47 71
1866.....	46,550	2,473,202	53 13	1910.....	17,665	799,002	45 23
1867.....	47,000	2,157,300	45 90	1911.....	19,109	879,205	46 01
1868.....	47,728	2,190,715	45 90	1912.....	20,600	866,024	42 04
1869.....	33,811	1,551,925	45 90	1913.....	15,661	630,042	40 23
1870.....	30,077	1,725,818	57 38	1914.....	11,373	557,846	49 05
1871.....	31,686	1,999,387	63 10	1915.....	14,199	1,157,449	81 52
1872.....	31,621	2,084,773	65 93	1916.....	21,427	2,003,425	93 50
1873.....	27,642	2,220,482	80 33	1917.....	24,382	2,396,466	98 29
1874.....	27,756	2,919,376	105 18	1918.....	22,621	2,579,472	114 03
1875.....	50,250	4,228,538	84 15	1919.....	15,200	1,353,381	89 04
1876.....	75,074	3,303,256	44 00	1920.....	10,278	775,527	75 45
1877.....	79,396	2,961,471	37 30	1921.....	3,157	140,666	44 56
1878.....	63,880	2,101,652	32 90	1922.....	3,466	191,851	55 35
1879.....	73,684	2,194,674	29 85	1923.....	5,458	332,851	60 98
1880.....	59,926	1,857,706	31 00	1924.....	7,948	543,080	68 33
1881.....	60,851	1,815,185	29 83	1925.....	7,683	621,831	80 81
1882.....	52,732	1,488,624	28 23	1926.....	5,892	516,382	87 64
1883.....	46,725	1,343,344	28 75	1927.....	6,488	714,418	111 67
1884.....	31,913	973,347	30 50	1928.....	^b 7,107	844,649	118 84
1885.....	32,073	986,245	30 75	1929.....	10,152	1,195,705	117 78
1886.....	29,981	1,064,326	35 50	1930.....	11,374	1,255,257	110 36
1887.....	33,760	1,430,749	42 38	1931.....	13,478	1,121,624	83 22
1888.....	33,250	1,413,125	42 50	1932.....	5,349	279,780	52 30
1889.....	26,464	1,190,880	45 00	1933.....	4,102	229,472	55 94
1890.....	22,926	1,203,615	52 50	1934.....	7,946	534,135	67 22
1891.....	22,904	1,036,406	45 25	1935.....	9,353	628,590	67 23
1892.....	27,993	1,139,595	40 71				
1893.....	30,164	1,108,527	36 75	Totals.....	2,794,780	\$115,851,134	

^a Flasks of 75 lbs. since June, 1904; of 76½ lbs. previously.

^b Flasks of 76 pounds, from January, 1928.

SILVER

Bibliography: State Mineralogist Reports IV, VIII, XII-XXXI (inc.). Bulletins 67, 91, 108. Min. & Sci. Press, March 1, 1919.

The 1935 silver output in California totaled 1,191,112 fine ounces valued at \$856,112, being an increase in both amount and value over the figures of the previous year which were 844,413 fine ounces worth \$545,883. Of the 1935 yield there were 23,902 fine ounces worth \$17,180 from placers. The average price paid for newly mined domestic silver was 71.875¢ per fine ounce during 1935, compared with 64.6¢ per fine ounce in 1934, 35¢ per fine ounce in 1933, and 28.2¢ per fine ounce in 1932.

Distribution of the 1935 silver production by counties was as follows:

<i>County</i>	<i>Fine ounces</i>	<i>Value</i>
Alpine -----	226	\$162
Amador -----	24,534	17,634
Butte -----	5,923	4,257
Calaveras -----	11,434	8,218
Colusa -----	9	6
Del Norte -----	5	3
El Dorado -----	8,268	5,943
Fresno -----	166	119
Humboldt -----	98	70
Imperial -----	4,147	2,981
Inyo -----	38,429	27,621
Kern -----	147,447	105,978
Lassen -----	396	285
Los Angeles -----	5,753	4,135
Madera -----	116	83
Mariposa -----	6,835	4,913
Merced -----	3,841	2,761
Modoc -----	11	8
Mono -----	101,056	72,634
Monterey -----	1	1
Napa -----	11,785	8,470
Nevada -----	520,362	374,010
Orange -----	15,461	11,113
Placer -----	18,941	13,614
Plumas -----	47,864	34,402
Riverside -----	2,717	1,953
Sacramento -----	4,100	3,163
San Bernardino -----	159,633	114,736
San Diego -----	90	65
San Joaquin -----	151	109
Santa Cruz -----	8	6
Shasta -----	33,121	23,805
Sierra -----	4,532	3,257
Siskiyou -----	2,240	1,610
Stanislaus -----	1,064	765
Trinity -----	3,487	2,506
Tulare -----	13	9
Tuolumne -----	2,753	1,979
Ventura -----	44	32
Yuba -----	3,751	2,696
Totals -----	1,191,112	\$856,112

The following paragraph is quoted from the U. S. Bureau of Mines,¹ chapter on Gold and Silver from Mineral Year Book 1936, by courtesy of Charles White Merrill and H. M. Gaylord:

"Silver—Production of recoverable silver in California in 1935 is estimated at 1,191,112 fine ounces valued at \$856,112 compared with 844,413 fine ounces valued at \$545,883 in 1934. This represents an increase of 42 per cent in quantity and 58 per cent in value. Virtually all the silver in California was produced as a by-product of gold mining. The companies producing the largest quantities, listed approximately in the order of their importance, were as follows: Lava Cap Gold Mining Corporation (Nevada County), Empire Star Mines Co., Ltd. (Nevada County), Spanish Mining Co. (Nevada County), Walker Mining Co. (Plumas County), Golden Queen Mining Co. (Kern County), and Coyote mine (San Bernardino County). This list contains some of the leading gold mines of the State. The Walker mine is principally a copper producer, and although the Coyote mine derived most of its revenue from silver, its gold was an important byproduct. Many smaller properties, most of which were gold mines, including some placers, supplied the remainder of the silver. Dredges, all of which were operated primarily for gold, found silver a profitable byproduct."

Silver Production of California, by Years.

The amount and value of the silver production of California, and the average price, annually, since 1880 are given in the table following. In the table shown in the statistical bulletins previous to Bulletin 97 (for 1925), the values shown for 1880–1904 (inc.) were taken from the reports of the Director of the Mint, of which the figures for 1880–1896 (inc.) were based on 'coinage value' (\$1.2929 per fine ounce). We

¹ U. S. Bureau of Mines Mineral Year Book 1936, p. 222.

have recalculated these to commercial value, using the price table of the U. S. Geological Survey (McCaskey, H. D.), Gold and Silver, 1913: Mineral Resources of the U. S., Part I, p. 847). From 1905 to date, the figures are those of the U. S. Geological Survey and its successors, the U. S. Bureau of Mines. Figures for the years prior to 1880 are not available, as there were no reliable records compiled.

Silver Production of California, by Years, Since 1880

Year	Fine oz.	Value	Average price per oz.	Year	Fine oz.	Value	Average price per oz.
1880.....	882,169	\$1,014,494	\$1 15	1909.....	2,098,253	\$1,091,092	\$0 52
1881.....	580,091	655,503	1 13	1910.....	1,840,085	993,646	54
1882.....	653,569	745,069	1 14	1911.....	1,270,445	673,336	53
1883.....	1,129,244	1,253,461	1 11	1912.....	1,300,136	799,584	615
1884.....	3,236,987	3,593,056	1 11	1913.....	1,378,399	832,553	604
1885.....	1,986,260	2,125,298	1 07	1914.....	1,471,859	813,938	553
1886.....	1,245,747	1,233,290	0 99	1915.....	1,678,756	851,129	507
1887.....	1,262,282	1,237,036	0 98	1916.....	2,564,354	1,687,345	658
1888.....	1,314,874	1,235,982	0 94	1917.....	1,775,431	1,462,955	824
1889.....	823,947	774,510	0 94	1918.....	1,427,711	1,427,711	1 00
1890.....	820,336	861,353	1 05	1919.....	1,107,189	1,240,051	1 12
1891.....	737,224	729,852	0 99	1920.....	1,706,327	1,859,896	1 09
1892.....	358,575	311,960	87	1921.....	3,629,223	3,629,223	1 00
1893.....	415,468	324,065	78	1922.....	3,100,065	3,100,065	1 00
1894.....	229,896	144,834	63	1923.....	3,559,443	2,918,743	82
1895.....	463,911	501,542	65	1924.....	3,555,133	2,381,952	67
1896.....	326,757	222,195	68	1925.....	3,054,416	2,119,765	694
1897.....	754,648	452,789	60	1926.....	2,022,460	1,262,015	624
1898.....	701,788	414,055	59	1927.....	1,620,242	918,677	567
1899.....	855,869	513,521	60	1928.....	1,478,771	865,081	585
1900.....	1,168,157	724,257	62	1929.....	1,176,895	627,285	533
1901.....	950,831	570,499	60	1930.....	1,622,803	624,779	385
1902.....	1,163,041	616,412	53	1931.....	867,818	251,667	290
1903.....	958,230	517,444	54	1932.....	493,533	139,176	282
1904.....	1,441,259	835,929	58	1933.....	402,591	140,907	350
1905.....	1,076,174	650,009	61	1934.....	844,413	545,883	^a 644
1906.....	1,220,641	817,830	68	1935.....	1,191,112	856,112	^a 719
1907.....	1,138,856	751,646	66				
1908.....	1,647,278	873,057	53	Totals.....	78,781,792	\$58,615,514	

^a Average price applied to newly mined within the United States.

TUNGSTEN

Bibliography: Reports XV, XVII, XVIII, XXII, XXIV, XXVII (inc.) XXX. Bulletins 38, 67, 91, 95, U. S. G. S., Bull. 652. Proc. Colo. Sci. Soc., Vol. XI. South Dakota School of Mines, Bulletin No. 12. Eng. and Min. Jour.-Press, Vol. 113, pp. 666-669, Apr. 22, 1922.

The commercial production of tungsten ores and concentrates in California began in 1905; and has been continuous since, with the exception of 1920-1922 (inclusive). The material shipped in 1935 was high-grade sorted ore and concentrates, coming from a single property in Kern County and two in San Bernardino County. A total of 125 short tons were reported shipped, yielding 118 tons recalculated to 60% WO₃ valued at \$194,542. The 1935 output showed a decrease in both quantity and value as compared with that of 1934, which was 261 tons worth \$224,417.

Quotations in "Metal and Minerals Markets" during 1935 ranged from \$16 to \$17.25 per unit WO₃ for Chinese wolframite, duty paid; and \$14.50 to \$17 for domestic scheelite. The highest prices were received at the end of the year. Present (April 1937) prices per unit

WO₃ at New York are: Chinese wolframite, duty paid, \$16; Bolivian scheelite, \$16; domestic scheelite, \$16.

Imports of foreign tungsten ores and alloys into the United States during 1935, according to the U. S. Bureau of foreign and Domestic Commerce totaled 1,587,313 pounds valued at \$383,656, compared with 1,570,211 pounds worth \$339,634 in 1934. The Tariff Act of 1930 raised the duty on tungsten ore or concentrates to 50 cents per pound on the metallic tungsten contained therein. Duties are also provided for imported tungsten-bearing alloys.

Tungsten ore has been produced in California principally in the Atolia-Randsburg district in San Bernardino and Kern counties, followed by the Bishop district in Inyo County, with small amounts coming from Nevada County and from the district near Goffs, in eastern San Bernardino. Most of California's tungsten ore is scheelite (calcium tungstate), though wolframite (iron-manganese tungstate) and hüberrite (manganese tungstate) also occur. The deposits at Atolia are the largest and most productive scheelite deposits known.

Total Tungsten Ore Production of California.

The annual amount and value of tungsten ores and concentrates produced in California since the inception of the industry is given herewith, with tonnages recalculated to 60% WO₃:

Year	Tons at 60% WO ₃	Value	Year	Tons at 60% WO ₃	Value
1905	57	\$18,800	1923	34	\$19,126
1906	485	189,100	1924	781	446,009
1907	287	120,587	1925	573	348,475
1908	105	37,750	1926	441	316,560
1909	577	190,500	1927	398	429,237
1910	457	208,245	1928	150	106,280
1911	387	127,706	1929	120	82,582
1912	572	206,000	1930	26	9,509
1913	559	234,673	1931	148	76,605
1914	420	180,575	1932	261	224,417
1915	962	1,005,467	1933	118	194,542
1916	2,270	4,571,521	1934		
1917	2,466	3,079,013	1935		
1918	1,982	2,832,222	Totals	14,850	\$15,474,713
1919	214	219,316			
1920					

* Annual details concealed under 'Unapportioned.'

TIN

Bibliography: Reports XV, XVII, XVIII, XXV, XXXI. Bulletins 67, 91.

In 1928 and 1929 there was a small amount of tin produced from California ore as well as considerable development work which was done at the Temescal mine in Riverside County near Corona. There was an output from the district during 1891-1892 as tabulated below. Small quantities of stream tin have been found in some of the placer workings in northern California, but never in paying amounts.

Two occurrences have also been noted, in northern San Diego County. Crystals of cassiterite were found there, associated with blue tourmaline crystals, amblygonite and beryl. No commercial quantity has been developed, only small pockets have been taken out.

Total Output of Tin in California

Year	Pounds	Value
1891 -----	125,289	\$27,564
1892 -----	126,000	32,400
1928} * -----	1,200	580
1929} -----		
Totals -----	252,489	\$60,544

* Annual details concealed under 'Unapportioned.'

TITANIUM

Bibliography: State Mineralogist's Report XXIII.

During 1934 there was no production of titanium ores reported in California. In 1927 the first recorded shipments of titanium minerals were made in California. The total of the 1927 and 1928 production was 10,013 tons valued at \$150,195. All of this came from Los Angeles County and was produced from either the beach black sands which contained approximately 20% titaniferous iron and magnetite, the gangue being silica and several silicates, or from a lode deposit in the San Gabriel Mountains.

The market price of titanium minerals varies as to the titanium oxide it contains. Present (Mar. 4, 1936) quotations are: Rutile 94% TiO at 10¢ a pound, ilmenite 45 to 52% TiO at \$10 to \$12 a ton, all prices Atlantic seaboard.

VANADIUM

Bibliography: Reports XV, XXVI. Bulletins 67, 91. Proc. Colo. Sci. Soc., Vol. XI. U. S. Bur. of Mines, Bulletin 104.

No commercial production of vanadium has yet been made in California. Occurrences of this metal have been found at Camp Signal, near Goffs, in San Bernardino County, and two companies at one time did considerable development work in the endeavor to open up paying quantities. Some ore carrying lead vanadate has been developed in the 29 Palms, or Washington district, on the line between Riverside and San Bernardino counties, but no shipments reported.

Present New York quotations for ferrovanadium are \$2.70-\$2.90 per pound of vanadium f.o.b. works, and vanadium ore 27½¢ per pound V₂O₅ contained.

ZINC

Bibliography: State Mineralogist Reports XIV, XV, XVII, XVIII, XX-XXIV, XXVI, XXVII, XXX. Bulletins 38, 67, 91.

The recoverable zinc mined in California during 1935 amounted to 328,013 pounds valued at \$14,432, compared with the 1934 output of 721,719 pounds worth \$31,034. The 1935 output came from Inyo and Orange counties.

The zinc ores of Shasta and Calaveras counties are associated with copper, while those of Inyo, Los Angeles and San Bernardino are associated principally with lead-silver and zinc-silver ores.

The production of metallic zinc¹ at reduction plants in the United States during 1935 amounted to 449,284 short tons valued at \$39,537,000 of which 6,450 tons were reduced from foreign ores and 28,650

¹ U. S. Bureau of Mines, Mineral Market Report 427, Jan. 6, 1936.

tons from secondary metal. The 1935 output was an increase over that of 1934, which was 383,281 short tons worth \$32,912,000.

The average price per pound for zinc in 1935 was 4¢, compared with 4.3¢ in 1934, 4.2¢ in 1933, 3.0¢ in 1932, and 3.8¢ in 1931.

Total Zinc Production of California.

Total figures for zinc output of the state are as follows, commercial production dating back only to 1906:

Year	Pounds	Value	Year	Pounds	Value
1906	206,000	\$12,566	1921	846,184	\$42,309
1907	177,759	10,598	1922	3,034,430	172,963
1908	54,000	3,544	1923		
1909			1924	3,060,000	198,900
1910			1925	11,546,602	877,542
1911	2,679,842	152,751	1926	29,447,559	1,533,568
1912	4,331,391	298,866	1927	8,625,004	552,000
1913	1,157,947	64,845	1928		
1914	399,641	20,381	1929		
1915	13,043,411	1,617,383	1931	149,865	5,314
1916	15,950,565	2,137,375	1932		
1917	11,854,801	1,209,190	1933	290,222	12,189
1918	5,565,516	506,466	1934	721,719	31,034
1919	1,384,192	101,046	1935	328,013	14,432
1920	1,188,009	96,229			
			Totals	107,012,723	\$9,671,491

STRUCTURAL MATERIALS

Bibliography: State Mineralogist Reports XII-XXXII (inc.). Bulletin 38. Spurr and Wormser. "Marketing of Metals and Minerals." "Non-Metallic Minerals." by R. B. Ladoo. See also under each substance.

As indicated by this subdivision heading, the mineral substances herein considered are those more or less directly used in building and structural work. California is independent, so far as these are concerned, and almost any reasonable construction can be made with materials produced in the State. Chromite, which previous to 1933 was listed under structural material in the statistical reports of the State Division of Mines, is now transferred to the metals group, thus coinciding with the practice of the United States Bureau of Mines.

This branch of the mineral industry for 1935 was valued at \$18,794,298, as compared with a total of \$22,837,446 for the year 1934. All the materials grouped under this classification showed an increase in 1935, with the exception of cement, miscellaneous stone, marble, and slate.

In 1935 all counties, with the exception of Sutter, contributed to this structural total. There is not a county in the fifty-eight counties of the State which is not capable of producing at least one of the materials under the classification and in 1926 every county contributed one or more substances to the group.

The following summary shows the value of the structural materials produced in California during the years 1934-1935, with increases or decreases in each instance:

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Brick and hollow building tile.....		\$1,644,661		\$1,555,343	\$201,682+
Cement.....	8,936,085 bbls.	12,445,616	8,086,292 bbls.	10,120,721	2,315,895—
Granite.....		249,083		339,917	90,834+
Lime.....	32,500 tons	309,765	59,731 tons	573,212	263,447+
Marble ^a		10,759		9,884	875—
Sandstone.....		14,245		9,268	4,977—
Slate.....		24,245		40,912	16,667+
Stone, miscellaneous.....		7,131,330		5,571,041	1,560,289—
Unapportioned.....		^b 249,125		^c 317,148	68,023+
Total values.....		\$22,078,829		\$18,837,446	
Net decrease.....					\$3,241,383—

^a Includes onyx and travertine.

^b Includes bituminous rock, magnesite, paving blocks, tube-mill pebbles.

^c Includes bituminous rock, magnesite, tube-mill pebbles.

ASPHALT

Bibliography: State Mineralogist Reports VII, X, XII-XV (inc.). XVII, XVIII. Bulletins 16, 32, 63, 67, 69, 91.

Asphalt was for a number of years accounted for in the statistical reports by the State Mining Bureau, because in the early days of the

oil industry, considerable asphalt was produced from outcroppings of oil sand, and was a separate industry from the production of oil itself. However, at the present time most of the asphalt comes from the oil refineries, which produce a better and more uniform grade; hence, its value is not now included in the mineral total, as to do so would be in part a duplication of the crude petroleum figures. Such natural asphalt as is at present mined is in the form of bituminous sandstones, and is recorded under that designation.

BITUMINOUS ROCK

Bibliography: State Mineralogist Reports XII, XIII, XV, XVII, XVIII, XXI, XXII, XXV, XXVI, XXXI.

This material is essentially an uncemented sandstone which is saturated with and held together by a natural asphaltic constituent, probably the residue from the evaporation of a crude petroleum deposit. Bituminous rock is still used to a limited extent for road dressing in those districts adjacent to available deposits, though the manufacture of asphalt at the oil refineries has almost entirely superseded the direct use of the native material. Some of the Santa Cruz County production is put on the market as a material which can be laid cold. This material is especially applicable and valuable for patch jobs.

During 1935 shipments of bituminous rock were made from Santa Barbara and Santa Cruz counties with a single producer in each. The annual details are concealed under the 'Unapportioned' item so as not to reveal the output of either operator. The total of the 1933 and 1934 yield was 36,793 short tons valued at \$130,301. The 1935 output showed a decrease in both amount and value from that of 1934.

Bituminous Rock Production of California, by Years.

The following tabulation shows the total amount and value of bituminous rock quarried and sold in California, from the records compiled by the State Mining Bureau, annually since 1887:

Year	Tons	Value	Year	Tons	Value
1887.....	36,000	\$160,000	1913.....	37,541	\$78,479
1888.....	50,000	257,000	1914.....	66,119	166,618
1889.....	40,000	170,000	1915.....	17,789	61,468
1890.....	40,000	170,000	1916.....	19,449	66,561
1891.....	39,962	154,164	1917.....	5,590	18,580
1892.....	24,000	72,000	1918.....	2,561	9,067
1893.....	32,000	192,036	1919.....	4,614	18,537
1894.....	31,214	115,193	1920.....	5,450	27,825
1895.....	38,921	121,586	1921.....	8,298	43,192
1896.....	49,456	122,500	1922.....	4,624	13,570
1897.....	45,470	128,173	1923.....	2,945	11,780
1898.....	46,836	137,575	1924.....	6,040	14,922
1899.....	40,321	116,097	1925.....	2,681	10,724
1900.....	25,306	71,495	1926.....	3,863	21,577
1901.....	24,052	66,354	1927.....	3,515	17,704
1902.....	33,490	43,411	1928.....	4,966	33,532
1903.....	21,944	53,106	1929.....	3,320	14,360
1904.....	45,250	175,680	1930.....	8,525	36,075
1905.....	24,753	60,436	1931.....	23,653	109,140
1906.....	16,077	45,204	1932.....		
1907.....	24,122	72,835	1933.....	36,793	130,301
1908.....	30,718	109,818	1934.....	*	*
1909.....	34,123	116,436	1935.....		
1910.....	87,547	165,711			
1911.....	75,125	117,279	Totals.....	1,269,126	\$4,005,868
1912.....	44,073	87,467			

* Annual details concealed under 'Unapportioned.'

BRICK AND HOLLOW TILE

Bibliography: State Mineralogist Reports VIII, X, XII–XV (inc.), XVII–XXVIII (inc.), XXXII. Bulletins 38, 99. Preliminary Report No. 7. Cal. Jour. of Development, June, 1925, pp. 5–6.

Bricks of many varieties and in important quantities are annually produced in California, as might be expected in a state with such diversified and widespread mineral resources. The varieties include common, fire, pressed, glazed, enamel, fancy, vitrified, sand-lime, and others. Not only do the plants here supply practically all of our own requirements in these products, but considerable quantities are shipped to contiguous territory and certain products are shipped over a much wider radius.

We also include under this heading the various forms of hollow building 'tile' or blocks. The application of this tile to residence construction as well as to other structures has grown, and their total out-



Plant of San Luis Brick Works at San Luis Obispo.

Photo by Herbert A. Franke.

put for 1935 showed an increase in value and tonnage as compared with the 1934 production.

The 1935 output of all kinds of brick showed an increased value of 14 per cent and an increased amount of 13 per cent as compared with that of 1934. The 1935 production consisted of 56,497 M of common brick valued at \$630,509; 17,771 M of fire brick valued at \$985,832; 2453 M of glazed, pressed, fancy, and vitrified paving-brick valued at \$67,117; and 21,309 tons of hollow building tile valued at \$171,885; which gave a total value for the year for brick and hollow building tile of \$1,855,343. The 1934 output had a total value of \$1,644,661.

Los Angeles County had the largest output of brick and building tile in 1935 with seventeen companies producing 29,709 M of common brick worth \$313,561; 8168 M of fire brick worth \$514,778; 645 M of fancy glazed and pressed brick worth \$22,076; and 1167 tons of hollow

building tile worth \$11,193. Alameda County had five operating plants by four companies with an output having a total value of \$218,988; Contra Costa County with three operating plants had a production with a total value of \$368,028; Sacramento with three plants, produced an output worth \$77,562; and Santa Clara County with three plants had an output worth \$44,541; there were two operating plants each in Kern, Orange, Riverside, San Diego, and San Joaquin counties; and one each in Amador, Butte, Fresno, Humboldt, Marin, Placer, San Bernardino, San Luis Obispo, Tulare, and Ventura counties.

Brick and Hollow Tile Production of California, by Years.

Record of brick production in the State has been kept since 1893 by this Bureau, the figures for hollow building 'tile' or blocks being also included since 1914. The annual and total figures, for amount and value, are given in the following table:

<i>Year</i>	<i>Brick, M</i>	<i>Hollow building blocks, tons</i>	<i>Value</i>
1893	103,900		\$801,750
1894	81,675		457,125
1895	131,772		672,360
1896	24,000		524,740
1897	97,468		563,240
1898	100,102		571,362
1899	125,950		754,730
1900	137,191		905,210
1901	130,766		860,488
1902	169,851		1,306,215
1903	214,403		1,999,546
1904	281,750		1,994,740
1905	286,618		2,273,786
1906	277,762		2,538,848
1907	362,167		3,438,951
1908	332,872		2,506,495
1909	333,846		3,059,929
1910	340,883		2,934,731
1911	327,474		2,638,121
1912	337,233		2,940,290
1913	358,754		2,915,350
1914	270,791		2,288,227
1915	180,538		1,678,756
1916	206,960		2,096,570
1917	192,269	29,348	2,532,721
1918	136,374	34,818	2,363,481
1919	156,328	36,026	3,087,067
1920	245,842	99,208	5,704,393
1921	238,022	67,100	5,570,875
1922	374,853	105,909	7,994,991
1923	397,754	122,534	9,738,082
1924	456,716	114,469	9,137,908
1925	361,094	105,491	7,503,976
1926	388,048	90,332	7,026,124
1927	374,111	75,116	6,516,077
1928	272,443	66,277	5,694,770
1929	327,011	66,713	5,607,410
1930	267,019	68,047	4,205,460
1931	151,545	51,988	2,560,415
1932	90,683	27,098	1,605,086
1933	76,905	25,814	1,520,481
1934	66,738	17,534	1,644,661
1935	76,521	21,309	1,855,343
Totals	10,165,002	1,225,131	\$134,690,881

CEMENT

Bibliography: State Mineralogist Reports VIII, IX, XII, XIV, XV, XVII, XVIII, XXI-XXVIII (inc.) XXXII. Bulletin 38.

During 1935 there was a production in California of 8,086,292 barrels of cement valued at \$10,120,721 f.o.b. plant, of which 2,948,575 barrels came from northern California plants and 5,137,717 barrels



Plant of Calaveras Cement Company near San Andreas, Calaveras County.

Photo by Herbert A. Franke.

from southern California plants. The 1935 output was a decrease from that of 1934, which was 8,936,085 barrels worth \$12,445,616.

Shipments during 1935 were made from ten plants in nine counties to the extent of 8,167,595 barrels valued at \$11,065,516, as compared with 8,591,951 barrels worth \$12,417,337. There were operating during the year, five plants in northern California, one each in Calaveras, Contra Costa, Merced, San Mateo and Santa Cruz counties, which shipped 3,030,105 barrels of cement, and five plants in southern California, two in San Bernardino and one each in Kern, Los Angeles,¹ and Riverside counties, which shipped 5,137,490 barrels. There were 1656 men employed in the above plants in 1935.

Cement Production of California, by Years.

'Portland' cement was first commercially produced in California in 1891; though in 1860 and for several years following, a natural hydraulic cement from Benicia was utilized in building operations in San Francisco.

"The Benicia Cement Company in 1859-60 was turning out 50 to 100 barrels of cement a day and San Francisco was using about 12,000 barrels a year. The mill price of the product was then \$4 a barrel. By 1865, the San Francisco rate of consumption had increased to 100,000 barrels yearly, brick buildings largely taking the place of frame structures, and the price of cement had fallen to \$2.50 a barrel, about the same as it is today."²

The growth of the industry became rapid after 1902; since which time cement has continued to be an important factor in the industrial life of the State. Although the total cement figures, to date, are not of the same magnitude as those for gold and petroleum, it is interesting

¹ The plant in Los Angeles County grinds clinker coming from Kern and San Bernardino counties, therefore the crude material is credited to the latter two.

² Monthly Review of Mercantile Trust Co. of Calif., Vol. XIII, No. 3, p. 55, Mar. 1924.

to note that the value of California's cement yield in the period 1920-1931 annually exceeded the value of her gold output.

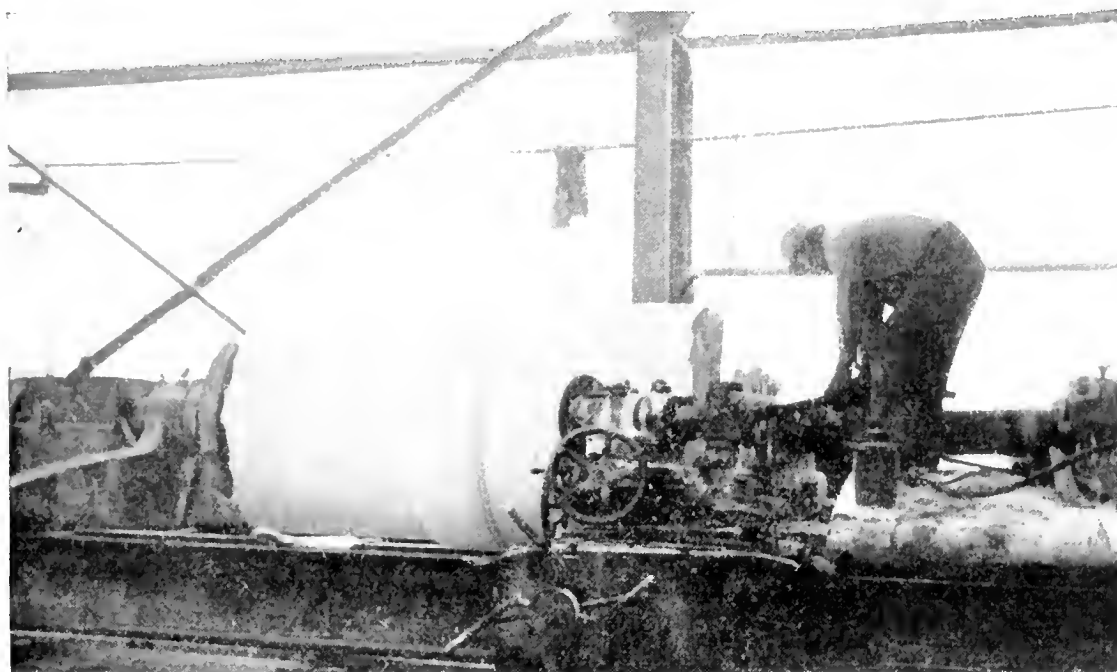
Cement Production of California, by Years

Year	Barrels	Value	Year	Barrels	Value
1891.....	5,000	\$15,000	1915.....	4,918,275	\$6,044,950
1892.....	5,000	15,000	1916.....	5,299,507	6,210,293
1893.....			1917.....	5,790,734	7,544,282
1894.....	8,000	21,600	1918.....	4,772,921	7,969,909
1895.....	16,383	32,556	1919.....	4,645,289	8,591,990
1896.....	9,500	28,250	1920.....	6,709,160	14,962,945
1897.....	18,000	56,000	1921.....	7,404,221	18,072,120
1898.....	50,000	150,000	1922.....	8,962,135	16,524,056
1899.....	60,000	180,000	1923.....	10,825,405	25,999,203
1900.....	52,000	121,000	1924.....	11,655,131	23,225,850
1901.....	71,800	159,842	1925.....	13,206,630	25,043,335
1902.....	171,000	423,600	1926.....	13,797,173	25,269,678
1903.....	640,868	968,727	1927.....	14,661,783	28,474,935
1904.....	969,538	1,539,807	1928.....	13,625,231	24,463,287
1905.....	1,265,553	1,791,916	1929.....	12,794,729	21,038,565
1906.....	1,286,000	1,941,250	1930.....	9,831,938	14,575,731
1907.....	1,613,563	2,585,577	1931.....	7,693,712	11,510,555
1908.....	1,629,615	2,359,692	1932.....	5,657,549	7,967,107
1909.....	3,779,205	4,969,437	1933.....	7,284,031	10,331,395
1910.....	5,453,193	7,485,715	1934.....	8,936,085	12,445,616
1911.....	6,371,369	9,085,625	1935.....	8,086,292	10,120,721
1912.....	6,198,534	6,074,661			
1913.....	6,167,806	7,743,024			
1914.....	5,109,218	\$6,558,148			
			Totals.....	227,509,176	\$378,703,040

GRANITE

Bibliography: State Mineralogist Reports X, XII-XXVI (inc.), XXVIII, XXXI. Bulletin 38.

The 1935 output of granite in California consisted of 88,306 cu. ft. of building stone valued at \$213,093; 26,560 cu. ft. of monumental stone valued at \$47,917; 11,300 linear ft. of curbing valued at \$7,500, and 338,310 cu. ft. of unclassified material, including a small amount



Turning a section of a granite column at plant of Kingsland Granite Company at Madera, Madera County.

Photo by C. McK. Laizure.

of tuff and volcanic rock, which was used as building stone and for flagstone, having a value of \$71,407; giving a total value for the year's yield at \$339,917. This was an increase over the 1934 total value which was \$249,083. The 1935 material came from nineteen quarries in twelve counties, four of which were in San Diego County, three in Sonoma County, two each in Fresno and Madera counties, and one each in Lassen, Mariposa, Nevada, Plumas, Placer, Sacramento, Tulare, and Ventura counties. The material from San Luis Obispo, Sonoma, and Ventura counties was tuff.

So far as possible, granite production has been segregated in the statement herewith into the various uses to which the product was put. It will be noted, however, that a portion of the output has been entered under the heading 'Unclassified.' This is necessary because of the fact that some of the producers have no way of telling to what specific use their stone was put after they had quarried and sold the same in the rough.

Varieties.

For building purposes, the granite found in California, particularly the varieties from Raymond in Madera County, Rocklin in Placer County and near Porterville in Tulare County, are unexcelled by any similar stone found elsewhere. The quantities available, notably at Raymond and Porterville, are unlimited. Most of California's 'granite,' particularly that found in the Sierra Nevada Mountains, is technically 'granodiorite' (that is, both plagioclase and orthoclase feldspars are present).

Granites of excellent quality for building and ornamental purposes are also quarried in Riverside and San Diego counties. Near Lakeside, San Diego County, there is a fine-grained, 'silver gray' granite of uniform texture and color, especially suited for monumental and ornamental work.

The Fresno County stone is a dark, hornblende diorite, locally called 'black granite,' whose color permits of a fine contrast of polished and unpolished surfaces, making it particularly suitable for monumental and decorative purposes. There is also a similar 'black granite' in Tulare County, near Success.

Granite Production of California, by Years.

The value of granite produced, annually, since 1887 has been as follows:

Year	Value	Year	Value
1887.....	\$150,000	1913.....	\$981,277
1888.....	57,000	1914.....	628,786
1889.....	1,329,018	1915.....	227,928
1890.....	1,200,000	1916.....	535,339
1891.....	1,300,000	1917.....	221,997
1892.....	1,000,000	1918.....	139,861
1893.....	531,322	1919.....	220,743
1894.....	228,816	1920.....	495,732
1895.....	224,329	1921.....	725,901
1896.....	201,004	1922.....	676,643
1897.....	188,024	1923.....	760,081
1898.....	147,732	1924.....	1,211,046
1899.....	141,070	1925.....	1,853,859
1900.....	295,772	1926.....	655,332
1901.....	519,285	1927.....	1,398,143
1902.....	255,239	1928.....	763,996
1903.....	678,670	1929.....	1,169,271
1904.....	467,472	1930.....	855,477
1905.....	353,837	1931.....	636,741
1906.....	344,083	1932.....	398,676
1907.....	373,376	1933.....	183,706
1908.....	512,923	1934.....	249,083
1909.....	376,834	1935.....	339,917
1910.....	417,898		
1911.....	355,742		
1912.....	362,975	Total value.....	\$27,342,256

LIME

Bibliography: Reports XIV, XV, XVII-XXIX (inc.), Bulletin 38.

In California during 1935 there was an output of lime amounting to 59,731 short tons valued at \$573,212 coming from two plants each in El Dorado, San Bernardino, and Santa Cruz counties; and one each in Alameda and Tuolumne counties. The above figures showed an increase in both amount and value over those of 1934 which were 32,500 tons worth \$309,765.

So far as we have been able to segregate the data, these figures include mainly only such lime as is used in building operations; though they do include a small proportion of calcined lime employed in agriculture and the chemical industries, the figures for which were not separable. A portion is hydrated lime. Limestone utilized in sugar making, for smelter flux, as a fertilizer, and other special industrial uses, are classified under 'Industrial Materials.' That consumed in cement manufacture is included in the value of cement.

Lime Production of California, by Years.

The following tabulation gives the amounts and value of lime produced in California by years since 1894 when compilation of such records was begun by the State Mining Bureau. The figures for quantity have been recalculated from 'barrels', as shown in the earlier reports, to 'tons' for the years 1894-1922 (inc.):

Year	Tons	Value	Year	Tons	Value
1894.....	37,350	\$318,700	1916.....	49,364	\$390,475
1895.....	39,776	386,094	1917.....	50,073	311,380
1896.....	30,275	261,505	1918.....	43,684	461,315
1897.....	28,780	252,900	1919.....	42,070	552,043
1898.....	29,786	254,010	1920.....	46,314	557,232
1899.....	29,985	314,575	1921.....	46,353	610,619
1900.....	31,252	283,699	1922.....	57,875	671,747
1901.....	31,738	334,688	1923.....	70,894	788,834
1902.....	44,866	369,616	1924.....	62,029	703,355
1903.....	49,659	418,280	1925.....	61,922	685,528
1904.....	57,945	571,749	1926.....	63,568	670,837
1905.....	61,700	555,322	1927.....	60,498	631,497
1906.....	68,927	763,060	1928.....	56,616	547,919
1907.....	68,422	756,376	1929.....	42,834	417,101
1908.....	39,639	379,243	1930.....	47,662	452,084
1909.....	52,075	577,824	1931.....	36,189	360,523
1910.....	47,951	477,683	1932.....	27,510	254,223
1911.....	42,959	390,988	1933.....	33,425	271,619
1912.....	52,212	464,440	1934.....	32,500	309,765
1913.....	61,344	528,547	1935.....	59,731	573,212
1914.....	43,996	378,663			
1915.....	35,653	286,304	Totals.....	1,977,501	\$19,545,574

MAGNESITE

Bibliography: State Mineralogist Reports XII-XV (inc.), XVII-XXVII (inc.), XXX, XXXI. Bulletins 38, 79, 91. U. S. Geol. Surv., Bulletins 355, 540. Min. Res. 1913, Pt. II, pp. 450-453. Min. & Sci. Press, Vol. 114, p. 237. "Magnesite"—Hearings before Comm. on Ways and Means, House of Repr., on H. R. 5218, June 16, 17, and July 17, 1919. Eng. Soc. W. Penn., Proc. 1913, Vol. 29, pp. 305-388, 418-444. Eng. & Min. Jour.-Pres., Vol. 114, July 29, and Dec. 2, 1922. U. S. Tariff Comm., "Crude and Caustic Calcined Magnesite. A Preliminary Statement of Information," May 19, 1926.

The production of crude magnesite in California during 1933 came from a single property each in Santa Clara and Stanislaus counties, both being operated by the same company. The annual details are concealed under the 'Unapportioned' item to conceal the output of this single operator. Practically all was shipped in the calcined form.

The output for 1935 showed an increase in both quantity and value over that of 1934. The 1934-1935 production showed a total of 62,509 short tons of crude magnesite valued at \$413,228, of which only a small amount was sold as such. Most of this material was calcined. The operators' reports showed that a total of 27,276 short tons of calcined material valued at \$659,619 rail shipping point, was made during 1934-1935, and was both dead-burned and periclase for refractories, and material for the plastic trade. From two to two and one-half tons of crude material are required to make one ton of calcined. The average price of crude magnesite reported in 1935 was \$6.70 per ton, compared

with \$6.50 per ton in 1934, \$5.60 per ton in 1933; \$10.00 per ton in 1932; \$8.45 per ton in 1931; and \$10.04 per ton in 1930.

In California the known deposits are mostly in the metamorphic rocks of the Coast Ranges and the Sierra Nevada, being associated with serpentine areas. The notable exceptions are the sedimentary deposits at Bissell in Kern County and at Afton in San Bernardino County. Several thousand tons have been shipped from the Bissell deposit; and small shipments have been made from the Afton property.

Imports.

The tariff act of 1930 placed the following import duties on magnesite: Crude magnesite 15/32¢ per lb., caustic-calcined magnesite 15/16¢ per lb., dead-burned and grain magnesite, not suitable for manufacture into oxychloride cements, 23/40¢ per lb.; magnesite brick ¾¢ per lb., and 10 per cent ad valorem. The figures of imports for 1935, as published by the U. S. Bureau of Foreign and Domestic Commerce, show a total of 26,166 short tons valued at \$466,990, as compared with 24,523 tons worth \$404,751 in 1934.

Total Magnesite Production of California.

The first commercial production of magnesite in California was made in the latter part of 1886 from the Cedar Mountain district,¹ southeast of Livermore, Alameda County. Shipments amounting to 'several tons' or 'several carloads' were sent by rail to New York; but there is apparently no exact record of the amount for that first year. The statistical records of the State Mining Bureau began with the year 1887, and the table herewith shows the figures for amount and value, annually, from that time. Shipments of magnesite from Napa County began in 1891 from the Snowflake Mine; from the Red Mountain deposits in Santa Clara County, in 1899; and from Tulare County in 1900.

Total Magnesite Production of California

Year	Tons	Value	Year	Tons	Value
1887.....	600	\$9,000	1913.....	9,632	\$77,056
1888.....	600	9,000	1914.....	11,438	114,380
1889.....	600	9,000	1915.....	30,271	283,461
1890.....	600	9,000	1916.....	154,052	1,311,893
1891.....	1,500	15,000	1917.....	209,648	1,976,227
1892.....	1,500	15,000	1918.....	83,974	803,492
1893.....	1,093	10,930	1919.....	44,696	452,094
1894.....	1,440	10,240	1920.....	83,695	1,033,491
1895.....	2,200	17,000	1921.....	47,837	511,102
1896.....	1,500	11,000	1922.....	55,637	594,665
1897.....	1,143	13,671	1923.....	73,963	946,643
1898.....	1,263	19,075	1924.....	67,236	900,183
1899.....	1,280	18,480	1925.....	64,623	872,944
1900.....	2,252	19,333	1926.....	50,915	587,642
1901.....	4,726	43,057	1927.....	46,093	577,887
1902.....	2,830	20,655	1928.....	45,645	501,590
1903.....	1,361	20,515	1929.....	47,269	488,014
1904.....	2,850	9,298	1930.....	38,681	388,472
1905.....	3,933	16,221	1931.....	21,576	182,283
1906.....	4,032	40,320	1932.....	40,303	282,325
1907.....	6,405	57,720	1933.....		
1908.....	10,582	80,822	1934.....	62,509	413,228
1909.....	7,942	62,588	1935.....		
1910.....	16,570	113,887			
1911.....	8,858	67,430			
1912.....	10,512	105,120			
			Totals.....	1,388,315	\$14,122,434

* Combined under "Unapportioned."

¹ See U. S. Geol. Surv.; Mineral Resources of U. S., 1886, pp. 6 and 696.

MARBLE

Bibliography: State Mineralogist Reports XII-XV (inc.), XVII-XXX (inc.). Bulletin 38. U. S. Bur. of Mines Bull. 106.

The 1935 production of marble in California was valued at \$9,884 (including some onyx and travertine from Solano and San Bernardino counties, and a small amount of limestone used as building stone and flagstone coming from an operator in Santa Cruz County). The marble came from a single quarry in Tuolumne County. The 1935 output showed a decrease in value from that of 1934, which was worth \$10,759.

California has many beautiful and serviceable varieties of marble, suitable for almost any conceivable purpose of construction or decoration. In the decorative class are deposits of onyx marble of beautiful coloring and effects. There is also serpentine marble suitable for electrical switchboard use.

Marble Production of California, by Years.

Data on annual production since 1887, as compiled by the State Mining Bureau, follows. Previous to 1894 no records of amounts were preserved.

Total Production of Marble in California, by Years

Year	Cubic feet	Value	Year	Cubic feet	Value
1887.....		\$5,000	1912.....	27,820	\$74,120
1888.....		5,000	1913.....	41,654	113,282
1889.....		87,030	1914.....	25,436	48,832
1890.....		80,000	1915.....	22,186	41,518
1891.....		100,000	1916.....	25,954	50,280
1892.....		115,000	1917.....	24,755	62,950
1893.....		40,000	1918.....	^a 17,428	49,898
1894.....	38,441	98,326	1919.....	25,020	74,482
1895.....	14,864	56,566	1920.....	^b 29,531	92,899
1896.....	7,889	32,415	1921.....	30,232	98,395
1897.....	4,102	7,280	1922.....	38,321	127,792
1898.....	8,050	23,594	1923.....	28,015	124,919
1899.....	9,682	10,550	1924.....	^b 61,579	140,253
1900.....	4,103	5,891	1925.....	35,664	116,105
1901.....	2,945	4,630	1926.....	34,806	119,999
1902.....	19,305	37,616	1927.....	^b 42,308	103,689
1903.....	84,624	97,354	1928.....	^b 34,324	82,190
1904.....	55,401	94,208	1929.....	^b 72,881	93,661
1905.....	73,303	129,450	1930.....	^b 65,715	82,194
1906.....	31,400	75,800	1931.....	^b 37,776	81,760
1907.....	37,512	118,066	1932.....	^b 25,506	42,505
1908.....	18,653	47,665	1933.....	^b 9,039	23,178
1909.....	79,600	238,400	1934.....	^b 7,185	10,759
1910.....	18,960	50,200	1935.....	^b	9,884
1911.....	20,201	54,103			
			Total value.....		\$3,479,688

^a Includes onyx and serpentine.
^b Includes onyx and travertine.

ONYX and TRAVERTINE

Bibliography: State Mineralogist Reports XII-XV (inc.), XVII, XVIII, XXI, XXIII, XXXI. Bulletin 38.

Onyx and travertine are known to exist in a number of places in California, but there has been only a small and irregular production since the year 1896. In 1935 there were two producers of onyx and travertine in Solano County. The 1935 output showed an increase in both quantity and value from that of 1934, the figures of which are combined

with marble. This material is used in terrazzo, auto gear-shift handles, bases for fountain-pen desk sets, and other ornamental purposes.

Onyx Production of California, by Years.

Production by years has been as follows:

Year	Value	Year	Value
1887.....	•	1923.....	\$2,510
1888.....	\$900	1924.....	•
1889.....	900	1925.....	16,120
1890.....	900	1926.....	7,575
1891.....	1,500	1927.....	•
1892.....	2,400	1928.....	•
1893.....	1,800	1929.....	•
1894.....	27,000	1930.....	•
1895.....	20,000	1931.....	•
1896.....	12,000	1932.....	•
1918.....	24,000	1933.....	•
1919.....	•	1934.....	•
1920.....	•	1935.....	•
1921.....	1,294		
1922.....	3,320	Total value.....	\$122,219

* See under Marble.

SANDSTONE

Bibliography: State Mineralogist Reports XII-XV, XVII, XVIII, XXI, XXIII, XXVI-XXVIII (inc.). Bulletin 38. U. S. Bur. of Mines, Bull. 124.

An unlimited amount of high-grade sandstone is available in California, but the wide use of concrete in buildings of every character, as well as the popularity of a lighter-colored building stone, has curtailed production in this branch of the mineral industry during recent years almost to a vanishing point. In 1935 a total of 38,426 cu. ft. of sandstone valued at \$9,268, was quarried in California and came from six properties in Los Angeles, Monterey, and San Luis Obispo counties; compared with 21,738 cu. ft. valued at \$14,245 for 1934.

Practically all of the material was flagstone which is used in garden walks, fountains, walls and fireplaces to give effect to Spanish and English types of homes. The material reported from Monterey and San Luis Obispo counties is in reality an indurated shale of the Monterey series, of a cream color and utilized as a building stone. Part of the material coming from Los Angeles County was schist and indurated shale.

A large portion of the sandstone was sold for landscape work and used as stepping stones for walks and for fountains, walls, etc.

Sandstone Production of California, by Years.

Amount and value, so far as contained in the records of this Bureau, are presented herewith, with total value from 1887 to date:

Year	Cubic feet	Value	Year	Cubic feet	Value
1887.....		\$175,000	1912.....	66,487	\$22,574
1888.....		150,000	1913.....	62,227	27,870
1889.....		175,598	1914.....	111,691	45,322
1890.....		100,000	1915.....	63,350	8,438
1891.....		100,000	1916.....	17,270	10,271
1892.....		50,000	1917.....	31,090	7,074
1893.....		26,314	1918.....	900	400
1894.....		113,592	1919.....	5,400	3,720
1895.....		35,373	1920.....	10,500	2,300
1896.....		28,379	1921.....	10,150	2,112
1897.....		24,086	1922.....	900	1,100
1898.....		46,384	1923.....	7,000	13,000
1899.....	56,264	103,384	1924.....	6,700	3,600
1900.....	378,468	254,140	1925.....	14,704	14,362
1901.....	266,741	192,132	1926.....	34,100	17,500
1902.....	212,123	142,506	1927.....	22,900	205,400
1903.....	353,002	585,309	1928.....	134,100	43,250
1904.....	363,487	567,181	1929.....	177,655	49,881
1905.....	302,813	483,268	1930.....	160,704	56,404
1906.....	182,076	164,068	1931.....	110,244	30,960
1907.....	159,573	148,148	1932.....	41,793	13,286
1908.....	93,301	55,151	1933.....	25,980	10,888
1909.....	79,240	37,032	1934.....	21,738	14,245
1910.....	165,971	80,443	1935.....	38,426	9,268
1911.....	255,313	127,314			
			Total value.....		\$4,578,027

SERPENTINE

Bibliography: State Mineralogist Report XV. Bulletin 38.

Serpentine has not been produced in California to a very large extent at any time. A single deposit, that on Santa Catalina Island, has yielded the principal output to date. Some material was shipped from there in 1917 and 1918, being the only output recorded since 1907. It was used for decorative building purposes and for electrical switchboards. As there was but a single operator, the figures were combined with those of marble output for those years.

Serpentine Production of California, by Years.

The following table shows the amount and value of serpentine from 1895 as recorded by this bureau:

Serpentine Production in California, by Years

Year	Cubic feet	Value	Year	Cubic feet	Value
1895.....	4,000	\$4,000	1904.....	200	\$2,310
1896.....	1,500	6,000	1905.....		
1897.....	2,500	2,500	1906.....	847	1,694
1898.....	750	3,000	1907.....	1,000	3,000
1899.....	500	2,000	1917.....	^a	^a
1900.....	350	2,000	1918.....	^b	^b
1901.....	89	890	1919.....		
1902.....	512	5,065			
1903.....	99	800	Totals.....	12,347	\$33,259

^a Under 'Unapportioned.'
^b See under Marble.

SLATE

Bibliography: State Mineralogist Reports XV, XVIII, XXIV, XXVIII. Bulletin 38. U. S. Geol. Surv., Bull. 586. U. S. Bur. of Mines, Bull. 218.

Slate was first produced in California in 1889. Up to and including 1910 such production was continuous, but since then it has been irregular. Large deposits of excellent quality are known in the State, especially in El Dorado, Calaveras and Mariposa counties, but the demand has been light owing principally to competition of cheaper roofing materials.

The production of slate in California during the year 1935 was 8066 tons and 40 squares having a total value of \$40,912 f.o.b. quarry and came from properties in El Dorado, Inyo, and Tuolumne counties. The 1935 figures showed an increase in both amount and value over those of 1934 which were 5,065 tons worth \$24,245. Practically all of the slate was crushed and used for roofing granules. The slate shingles came from an old quarry in El Dorado County.

Total Production of Slate in California.

A complete record of amount and value of slate produced in California follows:

Year	Squares	Value	Year	Squares	Value
1889.....	4,500	\$18,089	1909.....	6,961	\$45,660
1890.....	4,000	24,000	1910.....	1,000	8,000
1891.....	4,000	24,000	1911.....		
1892.....	3,500	21,000	1915.....	1,000	5,000
1893.....	3,000	21,000	1916.....		
1894.....	1,800	11,700	1920.....	8	80
1895.....	1,350	9,450	1921.....		
1896.....	500	2,500	1922.....	200	2,400
1897.....	400	2,800	1923.....		
1898.....	400	2,800	1926.....	^a	7,371
1899.....	810	5,900	1927.....	^b 2,686	17,960
1900.....	3,500	26,250	1928.....	^b 4,075	31,263
1901.....	5,100	38,250	1929.....		
1902.....	4,000	30,000	1930.....	^b 8,220	71,347
1903.....	10,000	70,000	1931.....		
1904.....	6,000	50,000	1932.....	^b 8,234	55,182
1905.....	4,000	40,000	1933.....	^b 5,343	31,958
1906.....	10,000	100,000	1934.....	^b 5,065	24,245
1907.....	7,000	80,000	1935.....	^a	40,912
1908.....	6,000	60,000			
			Total value.....		\$964,117

* Annual details concealed under 'Unapportioned.'

^a Quantity not shown as both 'squares' and 'tons' included.

^b Tons.

MISCELLANEOUS STONE

Bibliography: State Mineralogist Reports XII-XXVIII (inc.), XXXI-XXXII. Bulletin 38; also annual statistical bulletins from 1915 to date.

'Miscellaneous stone' is the name used throughout this report as the title for that branch of the mineral industry covering crushed rock of all kinds, paving blocks, sand and gravel, and pebbles for grinding mills. The foregoing are very closely related from the standpoint of the producer; therefore it has been found to be most satisfactory to group these items as has been done in recent reports of this Bureau.

So far as it has been possible to do so, crushed rock production has been subdivided into the various uses to which the product was put. It will be noted, however, a very large percentage of the output has been tabulated under the heading 'Unclassified.' This is necessary because of the fact that many of the producers have no way of telling to what specific use their rock was put (or at least the proportions to each use) after they have quarried and sold the same to distributors and contractors.

In addition to amounts produced by commercial firms, both corporations and individuals, there is hardly a county in the State but uses more or less gravel and broken rocks on its roads. Of much of this, particularly in the country districts, there is no definite record kept.

During the year 1935 the output of sand and gravel and that of crushed rock showed a decrease in quantity and value from that of 1934. There was a total value of \$5,571,041 for 'miscellaneous stone' during 1935, as compared with \$7,131,330 for 1934. As in the past Los Angeles County led in the annual output of these products, its 1935 yield being worth \$1,135,068, compared with \$1,220,639 in 1934; Alameda County was second with an output worth \$681,555; Contra Costa County third, with an output worth \$274,237; followed in turn by Sacramento, San Bernardino, San Diego, San Benito, Mariposa, Ventura, and Fresno counties.

Paving Blocks.

During 1935 there were no paving blocks reported produced in California.

There was a small output of paving blocks in California during 1934 coming from a single property each in Napa and Sacramento counties. The annual details are concealed under the 'Unapportioned' item so as not to reveal production of either operator.

The paving block industry has decreased materially of recent years, practically to the vanishing point, because of the increased construction of smoother pavements demanded by motor vehicle traffic. The blocks made in Solano County were of basalt; those from Sonoma are of basalt, andesite, and some trachyte, while those from Madera, Placer, Riverside, San Bernardino, and San Diego are of granite; and those from San Mateo County a sandstone.

The amount and value of paving block production, annually, since 1887 has been as follows:

Year	Amount M	Value	Year	Amount M	Value
1887.....	*10,000	\$350,000	1912.....	11,018	\$578,355
1888.....	10,500	367,500	1913.....	6,364	363,505
1889.....	7,303	297,236	1914.....	6,053	270,598
1890.....	7,000	245,000	1915.....	3,285	171,092
1891.....	5,000	150,000	1916.....	1,322	54,362
1892.....	*3,000	96,000	1917.....	938	38,567
1893.....	2,770	96,950	1918.....	372	17,000
1894.....	2,517	66,981	1919.....	27	1,350
1895.....	2,332	73,338	1920.....	63	3,155
1896.....	4,161	77,584	1921.....	4	280
1897.....	1,711	35,235	1922.....	72	3,924
1898.....	1,144	21,725	1923.....	15	880
1899.....	305	7,861	1924.....	11	935
1900.....	1,192	23,775	1925.....	27	1,350
1901.....	1,920	41,075	1926.....		
1902.....	3,502	112,437	1927.....	41	2,057
1903.....	4,854	134,642	1928.....	25	1,658
1904.....	3,977	161,752	1929.....		
1905.....	3,408	134,347	1930.....	66	5,900
1906.....	4,203	173,432	1931.....		
1907.....	4,604	199,347	1932.....		
1908.....	7,660	334,780	1934.....	2	75
1909.....	4,503	199,803	1935.....		
1910.....	4,434	198,916			
1911.....	4,141	210,819	Totals.....	135,840	\$5,325,578

* Figures for 1887-1892 (inc.) are for Sonoma County only, as none are available for other counties during that period though Solano County quarries were then also quite active.

* Annual details concealed under 'Unapportioned.'

Grinding-Mill Pebbles.

The 1935 output of grinding-mill pebbles in California is combined under the 'Unapportioned' item to conceal the production of a single operator each in San Diego and Siskiyou counties.

The amount and value of grinding-mill pebbles, annually, follows:

Year	Tons	Value
1915.....	340	\$2,810
1916.....	20,232	107,567
1917.....	21,450	90,538
1918.....	8,628	61,268
1919.....	2,607	19,272
1920.....	2,104	17,988
1921.....	247	1,418
1922.....	1,571	7,628
1923.....	2,650	14,936
1924.....	434	2,969
1925.....	215	1,385
1926.....	102	612
1927.....	288	1,800
1928.....	372	2,408
1929.....		
1930.....	166	1,225
1931.....		
1932.....	25	211
1933.....		
1934.....	300	3,018
1935.....	*	*
Totals.....	61,731	\$267,053

* Annual details concealed under 'Unapportioned.'

Sand and Gravel.

A considerable part of the gravel excavated is passed through grading and washing plants, and the material over 2 inches in size is crushed. Much of it is utilized in concrete mixtures. Most of the gravel used for road surfacing and repairs as well as that for railroad ballast is creek-run or pit-run material which is spread upon the roads without undergoing any grading or washing.

The distribution of the 1935 output of sand and gravel by counties is given in the following table:

<i>County</i>	<i>Tons</i>	<i>Value</i>
Alameda -----	^a 1,029,749	\$632,548
Amador -----	11,970	10,867
Butte -----	44,685	24,791
Contra Costa -----	^a 134,042	74,994
Del Norte -----	45,482	41,788
El Dorado -----	8,225	15,925
Glenn -----	61,752	41,285
Humboldt -----	139,808	39,692
Imperial -----	17,743	16,945
Kern -----	68,403	30,522
Lake -----	7,530	4,975
Lassen -----	26,512	8,189
Los Angeles -----	^b 2,184,230	916,337
Madera -----	4,225	1,017
Marin -----	15,600	4,775
Mariposa -----	11,829	5,779
Mendocino -----	28,413	10,332
Merced -----	24,000	14,750
Mono -----	31,237	33,717
Monterey -----	90,726	60,689
Napa -----	10,151	8,690
Nevada -----	3,495	1,668
Orange -----	116,024	40,663
Placer -----	6,338	2,992
Plumas -----	35,345	13,424
Riverside -----	^{a, b, d} 400,425	158,952
Sacramento -----	^a 131,632	96,095
San Bernardino -----	223,508	143,549
San Diego -----	^{a, b, c} 195,372	169,212
San Joaquin -----	171,130	86,192
San Luis Obispo -----	^a 52,225	22,236
Santa Barbara -----	17,125	8,081
Santa Clara -----	96,864	73,301
Santa Cruz -----	70,052	56,141
Shasta -----	56,528	38,281
Siskiyou -----	64,306	26,720
Sanoma -----	218,800	112,462
Stanislaus -----	130,034	72,387
Tehama -----	15,174	5,699
Trinity -----	6,409	3,803
Tulare -----	44,189	18,372
Tuolumne -----	21,930	9,055
Ventura -----	176,266	105,808
Yolo -----	78,170	33,950
Yuba -----	55,291	32,163
Alpine, Calaveras, Colusa, Fresno, Inyo, Kings, Modoc, San Benito, San Mateo, Sierra, Solano--	[*] 148,888	116,058
	<u>6,531,830</u>	<u>\$3,445,881</u>

* Combined to conceal the output of a single operator in each.

^a Includes molding sand.

^b Includes blast sand.

^c Includes roofing granules.

^d Includes filter sand.

Included in the above is a total of 19,954 tons of molding sand valued at \$52,924 coming from two properties in Contra Costa County; and one each in Alameda, Riverside, and Sacramento, San Diego, San Luis Obispo, San Mateo, and Ventura counties. The 1935 yield showed an increase compared with 1934 which was 34,565 tons worth \$55,066.

Crushed Rock.

To list the kinds and varieties of rock utilized commercially under this heading would be to run almost the entire gamut of the classification scale. Much depends on the kind available in a given district. Those which give the most satisfactory service are the basalts and other hard, dense, igneous rocks which break with sharp, clean edges. In many localities, river-wash boulders form an important source of such material. In such cases, combined crushing and washing plants obtain varying amounts of sand and gravel along with the crushed sizes. In Sacramento and Butte counties the tailings piles from the gold dredgers are the basis of like operations.

The values given are based on the selling price, f.o.b. cars, barges, or trucks, at the quarry.

MINERAL PRODUCTION OF CALIFORNIA

Crushed Rock Production, by Counties, for 1935

County	Macadam and ballast		Rubble and riprap		Concrete		Unclassified		Totals	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Alameda.....	*	*	1,000	\$1,000	*	*	^a 443,425	\$34,950	44,425	\$35,950
Alpine.....	14,505	\$8,739							14,425	8,739
Amador.....	9,118	6,199							9,118	6,199
Butte.....	*	*			*	*	^a 29,535	16,427	29,535	16,427
Calaveras.....	1,860	1,250					*	*	1,860	1,250
El Dorado.....	9,711	14,553			*	*	*	*	9,711	14,553
Fresno.....	^b 4,800	1,680			*	*	*	*	4,800	1,680
Humboldt.....	22,030	11,015					*	*	22,030	11,015
Inyo.....	2,468	846							2,468	846
Kern.....	17,274	16,500			*	*			17,274	16,500
Lake.....			133	340					32,101	16,340
Los Angeles.....	*	*	8,697	18,797	*	*	31,968	16,000	293,167	146,620
Madera.....	29,458	52,448	121	937		\$469	^b 284,470	127,823	29,797	53,864
Mariposa.....	71,623	165,442	1,185	5,705	218	1,100	162	240	74,810	172,487
Modoc.....	^c 28,745	33,448			1,840		18,880	9,000	47,625	42,448
Mono.....			825	4,315					825	4,315
Plumas.....			4,875	1,630	*	*			4,875	1,630
Riverside.....	7,886	6,946							7,886	6,946
Sacramento.....	33,212	43,749	1,785	816	*	*	83,809	93,097	118,806	137,662
San Bernardino.....	5,045	7,093	16,329	12,099			23,426	36,551	44,800	55,743
San Mateo.....	54,084	48,361			4,202	5,202	52,600	37,125	110,786	90,688
Santa Clara.....							53,572	39,742	53,872	39,742
Santa Cruz.....	*	*			*	*	^b 45,155	13,810	45,155	13,810
Shasta.....	5,226	11,034			5,940	9,000	431,899	14,555	42,765	34,569
Sierra.....	19,790	14,995							19,790	14,995
Siskiyou.....	^c 153,358	39,934							153,358	39,934
Sonoma.....	6,175	4,458	120	97	12,755	20,255	14,996	9,691	34,046	34,501
Tehama.....							7,355	5,515	7,355	5,515
Tulare.....	845	603			1,665	1,733	9,065	6,899	11,575	9,235
Tuolumne.....	36,750	27,565	1,365	2,730					38,115	30,295
Alameda, Butte, Contra Costa, Imperial, Los Angeles ^b , Marin, Napa, Orange ^b , San Benito, Santa Cruz, Stanislaus, Ventura ^a	514,602	400,369							514,602	400,369
Contra Costa, Marin, Napa, Placer, San Diego, Ven- tura ^a			34,311	35,153					34,311	35,153
Alameda, Butte, Contra Costa, El Dorado, Fresno, Kern, Los Angeles, Marin, Riverside, Sacramento, San Diego, Santa Cruz, Ventura ^a					391,439	359,802			391,439	359,802

Miscellaneous Stone Production of California, by Years.

The amount and value, annually, of crushed rock (including macadam, ballast, rubble, riprap, and that for concrete), and sand and gravel, since 1893, follow:

Crushed Rock, Sand and Gravel, by Years

Year	Tons	Value	Year	Tons	Value
1893.....	371,100	\$466,075	1915.....	10,879,497	\$4,609,278
1894.....	661,900	664,838	1916.....	9,951,089	4,009,590
1895.....	1,254,688	1,095,939	1917.....	8,069,271	3,505,662
1896.....	960,619	839,884	1918.....	6,641,144	3,325,889
1897.....	821,123	600,112	1919.....	6,919,188	3,678,322
1898.....	1,177,365	814,477	1920.....	9,792,122	6,782,414
1899.....	964,898	786,892	1921.....	10,914,145	7,834,840
1900.....	789,287	561,642	1922.....	13,049,644	10,366,231
1901.....	530,396	641,037	1923.....	19,840,301	15,379,838
1902.....	2,056,015	1,249,529	1924.....	21,451,129	15,962,476
1903.....	2,215,625	1,673,591	1925.....	23,819,137	17,407,113
1904.....	2,296,898	1,641,877	1926.....	24,987,606	19,859,261
1905.....	2,624,257	1,716,770	1927.....	25,126,691	18,912,994
1906.....	1,555,372	1,418,406	1928.....	27,471,794	17,328,044
1907.....	2,288,888	1,915,015	1929.....	27,104,618	17,840,159
1908.....	3,998,945	3,241,774	1930.....	23,514,168	16,430,027
1909.....	5,531,561	2,708,326	1931.....	15,848,313	11,848,531
1910.....	5,827,828	2,777,690	1932.....	11,361,564	7,183,643
1911.....	6,487,223	3,610,357	1933.....	11,181,156	6,871,581
1912.....	8,044,937	4,532,598	1934.....	16,148,275	7,131,330
1913.....	9,817,616	4,823,056	1935.....	9,041,876	5,571,041
1914.....	9,288,397	3,960,973			
			Totals.....	382,677,666	\$263,568,922

A comparison of the above table of annual production of these materials with the similar table for cement (see *ante*) reveals the fact that the important growth of the crushed rock and gravel business has been coincident with the rapid development of the cement industry from the year 1902.

INDUSTRIAL MATERIALS

Bibliography: State Mineralogist Reports XII-XXXII (inc.). Bulletin 38. Min. & Sci. Press, Vol. 114, March 10, 1917. Spurr and Wormser, "Marketing of Metals and Minerals." "Non-Metallic Minerals," by R. B. Ladoo. See also under each substance.

The following mineral substances have been arbitrarily arranged under the general heading of 'Industrial Materials,' as distinguished from those which have a clearly defined classification, such as metals, salines, structural materials, etc.

These materials, many of which are mineral earths, are, with four or five exceptions, as yet produced on a comparatively small scale. The possibilities of development along several of these lines are large, and with increasing transportation and other facilities, together with steadily growing demands, the future for this branch of the mineral industry in California is promising. There is scarcely a county in the State but might contribute to the output.

Up to within the last few years, at least, production has been in the majority of instances dependent upon more or less of a strictly local market, and the annual tables show the results of such a condition, not only in the widely varying amounts of a certain material produced from year to year, but in widely varying prices of the same material.

The more important of these minerals thus far exploited, so far as shown by value of the output, are barytes, bentonite (fuller's earth), pottery clay, diatomite, dolomite, gypsum, limestone, mineral water, pumice and volcanic ash, pyrite, silica, and soapstone and talc.

This group, as a whole, showed an increase in total value from \$4,276,566 in 1934 to \$4,618,588 in 1935.

The following table gives the comparative figures for the amounts and value of industrial minerals produced in California during the years 1934 and 1935.

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Barytes.....	21,769 tons	\$125,514	22,979 tons	\$133,810	\$8,296+
Bentonite (Fuller's Earth).....	6,168 tons	69,325	10,204 tons	68,372	953—
Clay (pottery).....	190,510 tons	245,900	240,014 tons	377,969	132,069+
Gems.....		2,456		948	1,508—
Gypsum.....	58,149 tons	113,606	70,833 tons	151,807	38,201+
Limestone.....	198,057 tons	461,139	227,214 tons	496,054	34,915+
Mineral water.....	19,882,436 gals.	1,071,197	16,659,254 gals.	940,333	130,864—
Pumice and volcanic ash.....	9,951 tons	54,248	14,890 tons	87,055	32,807+
Silica (glass, sand, quartz).....	70,432 tons	296,643	70,835 tons	297,272	629+
Soapstone and talc.....	13,920 tons	158,606	17,332 tons	170,830	12,224+
Sulphur.....	4,412 tons	67,656	*	*	—
Unapportioned.....		^a 1,610,276		^b 1,894,138	283,862+
Total values.....		\$4,276,566		\$4,618,588	
Net increase.....					\$342,022+

* Included under 'Unapportioned.'

^a Includes asbestos, carbon dioxide, diatomite, dolomite, feldspar, fluorspar, pyrite, sillimanite-andalusite-cyanite group, wollastonite.

^b Includes carbon dioxide, diatomite, dolomite, feldspar, graphite, mica, mineral paint, pyrite, sillimanite-andalusite-cyanite group, sulphur.

ASBESTOS

Bibliography: State Mineralogist Reports XII-XIX (inc.), XXII, XXVII (inc.), XXIX, XXXI-XXXII. Bulletins 38, 91. Canadian Dept. of M. Mines Branch Bulletin 69. Min. and Sci. Press, April 10, 1920, pp. 531-533. Eng. & Min. Jour.-Press, Vol. 113, pp. 617-625, 670-677. Asbestology, Vol. 5, No. 7, July, 1927.

During 1935 there was no asbestos reported produced in California. In 1934 there was a small output of this material coming from a property in Napa County, and was used in roofing and plaster. The 1934 annual figures are combined under the 'Unapportioned' item to conceal the output of a single operator.

Asbestos Production of California, by Years.

Total amount and value of asbestos production in California since 1887, as given in the records of this Bureau, are as follows:

Year	Tons	Value	Year	Tons	Value
1887.....	30	\$1,800	1912.....	90	\$2,700
1888.....	30	1,800	1913.....	47	1,175
1889.....	30	1,800	1914.....	51	1,530
1890.....	71	4,260	1915.....	143	2,860
1891.....	66	3,960	1916.....	145	2,380
1892.....	30	1,830	1917.....	136	10,225
1893.....	50	2,500	1918.....	229	9,903
1894.....	50	2,250	1919)*.....	131	6,240
1895.....	25	1,000	1920)*.....	410	19,275
1896.....			1921.....	50	1,800
1897.....			1922.....	20	200
1898.....	10	200	1923.....	70	4,750
1899.....	30	750	1924.....	25	1,650
1900.....	50	1,250	1925)*.....		
1901.....	110	4,400	1926)*.....	13	1,160
1902.....			1927)*.....		
1903.....			1928)*.....	219	6,175
1904.....	10	162	1929)*.....		
1905.....	112	2,625	1930)*.....		
1906.....	70	3,500	1931.....		
1907.....	70	3,500	1932)*.....	309	3,274
1908.....	70	6,100	1933)*.....		
1909.....	65	6,500	1934)*.....		
1910.....	200	20,000	1935.....		
1911.....	125	500	Totals.....	3,392	\$145,984

* Annual details concealed under 'Unapportioned.'

BARITE

Bibliography: State Mineralogist Reports XII, XIV, XV, XVII, XXI-XXVII (inc.). Bulletins 38, 87. Eng. & Min. Jour.-Press, Vol. 114, p. 109, July 15, 1922; Vol. 115, pp. 319-324, Feb. 17, 1923. U. S. Bureau of Mines, Inform. Circ. 6221, 6223.

During 1935 there was a commercial production of barite in California amounting to a total of 22,979 short tons valued at \$133,810, f.o.b. railroad-shipping point, as compared with the 1934 output of 21,769 tons worth \$125,514.

The 1935 output came from Mariposa, Plumas, and Tulare counties with a single producer in each. This material was consumed in the manufacture of lithopone, in heavy-gravity oil-well drilling-mud, fillers, and barium chemicals.

The Tariff Act of 1930 placed a duty on foreign imported barite ore, crude or unmanufactured, of \$4 per ton; ground or otherwise manufactured, of \$7.50 per ton.

Present quotations for barite (93% BaSO_4) vary from \$6 to \$7 (Calif. \$7) per ton, crude, f.o.b. rail-shipping point. Most barite has to be washed and acid treated to remove iron stains or other impurities before being suitable for paint use.

Known occurrences of this mineral in California are located in Inyo, Los Angeles, Mariposa, Monterey, Nevada, San Bernardino, Shasta, Santa Barbara and Tulare counties. The deposit at El Portal, in Mariposa County, have given the largest commercial production to date, in part witherite (barium carbonate, BaCO_3). Witherite has also been found in Shasta County, but no shipments have yet been made from the deposit.

Total Barite Production of California.

The first recorded production of barite in California, according to the statistical reports of the State Mining Bureau, was in 1910. The annual figures are as follows:

Year	Tons	Value	Year	Tons	Value
1910.....	860	\$5,640	1924.....		
1911.....	309	2,207	1925.....		
1912.....	564	2,812	1926.....	4,978	\$38,165
1913.....	1,600	3,680	1927.....	17,993	90,617
1914.....	2,000	3,000	1928.....	13,406	55,888
1915.....	410	620	1929.....	26,796	168,829
1916.....	1,606	5,516	1930.....	19,783	133,107
1917.....	4,420	25,633	1931.....	27,832	156,647
1918.....	100	1,500	1932.....	8,507	49,409
1919.....	1,501	18,065	1933.....	8,405	49,595
1920.....	3,029	20,795	1934.....	21,769	125,514
1921.....	601	4,806	1935.....	22,979	133,810
1922.....	3,370	18,925			
1923.....	2,925	16,058	Totals.....	196,043	\$1,130,851

BENTONITE (Fuller's Earth)

Bibliography: State Mineralogist Reports XIV, XVII, XVIII, XXI, XXIII, XXV-XXVI (inc.). Bulletins 38, 91. U. S. Bureau of Mines, Bulletin 71. Eng. & Min. Jour.-Press. Vol. 121, pp. 837-842, May 22, 1926.

During 1935 there was produced and shipped in California, 10,204 short tons of bentonite (fuller's earth) valued at \$68,372, coming from seven properties—four in San Bernardino County and one each in Inyo, San Benito, and San Diego counties. The 1935 output, as compared with that of 1934, showed an increase in amount with a decrease in value which was 6168 tons, worth \$69,325.

Previous to 1931 the Division of Mines classed this material under the heading of 'fuller's earth,' but it was thought advisable to change the name to bentonite, owing to the fact that much bentonite is employed in uses that can not be classed as fuller's earth and therefore has been classified in these reports under pottery clay. This was somewhat confusing. Bentonite is the name commonly applied to the clays of the montmorillonite and halloysite group ('rock soap').

Fuller's earth includes many kinds of unctuous clays. It is usually soft, friable, earthy, nonplastic, white and gray to dark green in color, and some varieties disintegrate in water. Production has come mainly from Calaveras and Solano counties, with other deposits noted also in Riverside, Fresno, Inyo and Kern counties.

The Tariff Act of June 21, 1930, placed a duty of \$1.50 a ton on foreign produced imported fuller's earth.

Bentonite Production of California by Years.

Bentonite including a small amount of fuller's earth was first produced commercially in this State in 1899, and the total amount and value of the output since that time are as follows:

Year	Tons	Value	Year	Tons	Value
1899.....	620	\$12,400	1919.....	385	\$3,810
1900.....	500	3,750	1920.....	600	6,000
1901.....	1,000	19,500	1921.....	1,185	8,295
1902.....	987	19,246	1922.....	6,606	48,756
1903.....	250	4,750	1923.....	3,650	55,125
1904.....	500	9,500	1924.....	5,290	67,295
1905.....	1,344	38,000	1925.....	5,280	91,842
1906.....	440	10,500	1926.....	23,552	250,192
1907.....	100	1,000	1927.....	13,018	154,764
1908.....	50	1,000	1928.....	53,323	501,743
1909.....	459	7,385	1929.....	15,541	170,563
1910.....	340	3,820	1930.....	12,522	177,964
1911.....	466	5,294	1931.....	13,960	222,583
1912.....	876	6,500	1932.....	4,295	57,670
1913.....	460	3,700	1933.....	4,605	60,621
1914.....	760	5,928	1934.....	6,168	69,325
1915.....	692	4,002	1935.....	10,204	68,372
1916.....	110	550			
1917.....	220	2,180	Totals.....	173,403	\$1,510,169
1918.....	37	333			

CARBON DIOXIDE GAS

Bibliography: State Mineralogist Report XII.

Carbon dioxide gas was first produced commercially in California in 1894. This material came from a drift on the 575 level of the Santa Isabel shaft of the New Almaden Quicksilver mine at Almaden, Santa Clara County. The drift was bulkheaded and a pipe was placed through the bulkhead for the gas to be drawn off, it then being compressed into cylinders and used in the manufacture of soda water.

In 1933 carbon dioxide gas was again produced, this time from wells drilled near Niland, Imperial County. On November 1, 1934, a dry-ice plant was put into operation for condensation of the carbon dioxide produced from the above wells. The 1935 figures are combined under the 'Unapportioned' item to conceal the output of a single producer.

Carbon Dioxide Gas Production in California, by Years

Year	M cu. ft.	Value
1894 -----	80	\$4,072
1895 -----	800	12,000
1896 -----	81	1,300
1897 -----	---	-----
1933} -----	15,440	1,822
1934} -----		
1935}* -----		
Totals -----	16,401	\$19,194

*Annual details concealed under 'Unapportioned.'

CLAY (Pottery)

Bibliography: State Mineralogist Reports I, IV, IX, XII-XV, XVIII-XXVIII (inc.), XXX-XXXII (inc.). Bulletins 38, 99. Preliminary Report No. 7. U. S. Bureau of Standards, Tech. Paper No. 262.

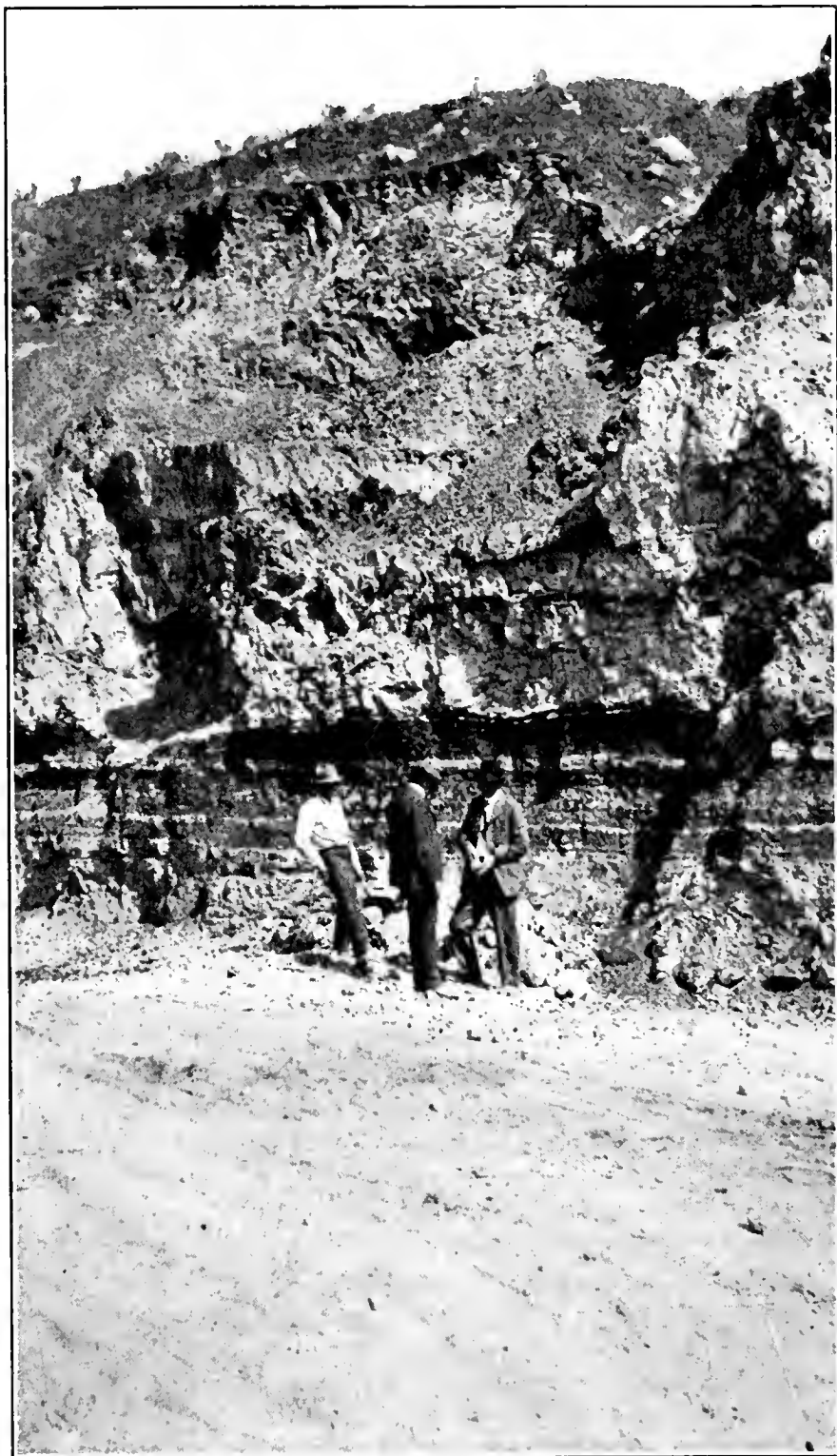
At one time or another in the history of the State, pottery clay has been mined in thirty-three of its counties. Of these, 17 contributed in 1935. In this report, 'pottery clay' refers to all clays used in the manufacture of red and brown earthenware, china and sanitary ware, flower pots, floor, faience and ornamental tiling, architectural terra cotta, sewer pipe, drain and roof tile, etc., and the figures for amount and value are relative to the crude material at the pit, without reference to whether the clay was sold in the crude form or was immediately used in the manufacture of any of the above finished products by the producer. It does not include clay used in making brick and hollow building blocks.

There are many other important uses for clay besides pottery manufacture. Among these may be enumerated paper, cotton goods, and chemicals. Clays of the montmorillonite and halloysite group ('rock soap') are being utilized successfully in the manufacture of soaps and for filtering oils and as oil-well drilling mud, also as an earth filler in irrigating ditches which run through porous ground.

During 1935 there was a total of 50 properties in 17 counties which reported an output of 240,014 short tons of pottery clay valued at \$377,969 f.o.b. rail-shipping point for the crude material, as compared with 51 properties in 17 counties producing 190,510 tons, worth \$245,900 in 1934.

Because of the fact that a given product often requires a mixture of several different clays, and that these are not all found in the same pit, it is necessary for most clay-working plants to buy some part of their raw materials from other localities. For these reasons, in compiling the clay industry figures much care is required to avoid duplications. So far as we have been able to segregate the figures, from the data sent in by the operatives, we have credited the clay output to the counties from which the raw material originated; and have deducted tonnages used in brick manufacture, as bricks are classified separately, herein.

A tabulation of the direct returns from the producers, by counties, for the year 1935 is shown herewith:



Exposure of lignite coal and clay beds in pit of Alberhill Coal and Clay Company at Alberhill, Riverside County

From State Mineralogist Report XXXI, p. 519.

POTTERY CLAY IN 1935

<i>County</i>	<i>Tons</i>	<i>Value</i>	<i>Used in the manufacture of</i>
Alameda -----	3,782	\$3,282	Roofing, floor, and mantel tile; chimney, drain, and sewer pipe.
Amador ^a -----	37,876	66,654	Architectural terra cotta; fire-clay and refractories; chimney; drain and sewer pipe; floor, mantel, and roofing tile; art pottery; electrical porcelain; and various.
Los Angeles -----	18,118	11,829	Red earthenware; chimney, drain, and sewer pipe; vents; floor, mantel, and roofing tile; art pottery; and various.
Orange -----	19,276	60,021	Architectural terra cotta; conduits and segment blocks; electrical, porcelain, and chinaware; refractories; vents; drain, floor, and mantel tile; art pottery; and various.
Placer -----	19,508	76,141	Architectural terra cotta; chimney, drain and sewer pipe; faience; floor, mantel, and roofing tile; red earthenware; electrical porcelain; sanitary ware; and various.
Riverside -----	54,356	73,809	Conduit, sewer, and drain pipe; red earthenware; faience, floor, mantel, and roofing tile; and various.
San Bernardino ^a -----	2,623	23,690	Roofing, floor and mantel tile; drain and sewer pipe; red earthenware; refractories; fire-sand; and various.
Santa Clara -----	2,778	2,263	Sewer pipe; art pottery; drain, floor, mantel, and roofing tile; stoneware; and various.
Calaveras, Contra Costa, Humboldt, Kern, ^b Sacramento, San Diego, San Luis Obispo, ^b Stanislaus, Ventura * -----	51,697	60,180	Drain, roofing, and mantel tile; saggars; electrical porcelain; refractories; red earthenware, garden furniture; oil-well drilling-mud; sewer, drain, and conduit pipe; and various.
Totals -----	240,042	\$377,969	

* Combined to conceal the output of single operators in each.

^a Includes firesand.

^b Includes clay and shale used for oil-well drilling-mud.

POTTERY CLAY PRODUCTS

The value of the various pottery clay products made in California during 1935 totaled \$6,688,117, compared with \$4,258,303 in 1934. The distribution for 1935 is shown in the following tabulation:

<i>Product</i>	<i>Number of Producers</i>	<i>Tons</i>	<i>Value</i>
Architectural terra cotta-----	3	2,244	\$244,300
Chimney pipe and flue lining-----	10	5,095	175,799
Drain pipe -----	16	3,502	64,239
Roofing tile -----	20	42,100	430,631
Floor, faience, mantel, and hand made tile-----	26	-----	1,198,581
Sewer pipe -----	8	35,304	841,523
Red earthenware -----	6	-----	93,958
Stoneware and chemical stoneware-----	4	-----	265,208
Electrical porcelain -----	5	-----	224,665
Conduit pipe -----	4	2,947	68,472
Fire clay shapes-----	4	-----	58,689
Fire clay and high temperature cement-----	10	7,390	94,122
Art pottery and chinaware-----	9	-----	834,607
Garden furniture -----	3	-----	110,298
Sanitary ware and plumbing fixtures-----	4	-----	1,279,818
Miscellaneous: chimney accessories, gas-stove radiants, earthenware, porcelain shapes, gas-house tank-blocks, grog, molding clay, segment blocks and liners, vents, sillimanite, brick and shapes, glass-tank blocks, and liners, light aggregate, glazed kitchenware, and crushed rock -----	16	-----	703,207
Total value -----			\$6,688,117

All the above clay products in 1935 showed an increased total value with the exception of architectural terra cotta and red earthenware over that of the previous year.

Pottery Clay Production of California, by Years.

Amount and value of crude pottery clay output in California since 1887 are given in the following table:

Year	Tons	Value	Year	Tons	Value
1887.....	75,000	\$37,500	1913.....	231,179	\$261,273
1888.....	75,000	37,500	1914.....	179,948	167,552
1889.....	75,000	37,500	1915.....	157,866	133,724
1890.....	100,000	50,000	1916.....	134,636	146,538
1891.....	100,000	50,000	1917.....	166,298	154,602
1892.....	100,000	50,000	1918.....	112,423	166,788
1893.....	24,856	67,284	1919.....	135,708	245,019
1894.....	28,475	35,073	1920.....	203,997	440,689
1895.....	37,660	39,685	1921.....	225,120	362,172
1896.....	41,907	62,900	1922.....	277,232	473,184
1897.....	24,592	30,290	1923.....	376,863	697,841
1898.....	28,947	33,747	1924.....	417,928	651,857
1899.....	40,600	42,700	1925.....	537,587	674,376
1900.....	59,636	60,956	1926.....	801,461	806,509
1901.....	55,679	39,144	1927.....	867,419	872,661
1902.....	67,933	74,163	1928.....	887,807	1,394,950
1903.....	90,972	99,907	1929.....	839,949	1,127,527
1904.....	84,149	81,952	1930.....	938,586	795,517
1905.....	133,805	130,146	1931.....	332,680	408,931
1906.....	167,267	162,283	1932.....	167,284	204,890
1907.....	160,385	254,454	1933.....	141,629	211,711
1908.....	208,042	325,147	1934.....	190,510	245,900
1909.....	299,424	465,647	1935.....	240,014	377,969
1910.....	249,028	324,099			
1911.....	224,576	252,759	Totals.....	11,316,662	\$14,082,699
1912.....	199,605	215,683			

DIATOMITE (Diatomaceous Earth)

Bibliography: State Mineralogist Reports II, XII-XV (inc.), XVII-XXVIII (inc.), XXXI, XXXII. Bulletins 38, 67, 91. Am. Inst. Min. Eng., Bull. 104, Aug. 1915, pp.1539-1550. U. S. Bur. of Mines, Rep. of Investigations: Serial No. 2341, Jan. 1923. Eng. & Min. Jour.-Press, Vol. 115, pp. 1152-1154, June 30, 1923.

Diatomite, also known as diatomaceous earth, infusorial earth, tripolite and kieselguhr, is very light (when dry a cubic foot weighs 18 to 20 pounds) and extremely porous, chalk-like material composed of pure silica (chalk, being calcareous) which has been laid down under water and consists of the remains of microscopical infusoria and diatoms. The former are animal remains, and the latter are from plants.

The most important deposits in California thus far known are located in Monterey, Orange, San Luis Obispo, and Santa Barbara counties. The Santa Barbara material is diatomaceous and is of a superior quality, particularly for filtration uses which bring the higher prices. Infusorial or diatomaceous earths are also found in Fresno, Kern, Los Angeles, Plumas, San Benito, San Bernardino, San Joaquin, Shasta, Sonoma and Tehama coutnies.

As about 70 per cent of the California output is from a single operator, we have concealed the exact figures under the 'Unapportioned' item in the State and county totals. There were six operators during 1935 in Fresno, Los Angeles, Monterey, Santa Barbara, and Stanislaus counties. The shipments during the year showed an increase in total tonnage and value compared with 1934.

The material shipped was utilized for insulation of both heat and sound, filtration, paint, pigment, cement admixture, fillers, abrasives and for clarification of gasoline and kerosene.

Total Production of Diatomite in California.

The first recorded production of these materials in California occurred in 1889; total amount and value of output, to date, are as follows:

Year	Tons	Value	Year	Tons	Value
1889	39	\$1,335	1914	12,840	\$80,350
1890			1915	12,400	62,000
1891			1916	15,322	80,649
1892			1917	24,301	127,510
1893	50	2,000	1918	35,963	189,459
1894	51	2,040	1919	40,200	217,800
1895			1920	60,764	1,056,260
1896			1921		
1897	5	200	1922	*90,739	1,016,675
1898			1923		
1899			1924	*193,064	5,729,736
1900			1925		
1901			1926		
1902	422	2,532	1927	* 275,403	1,995,923
1903	2,703	16,015	1928		
1904	6,950	112,282	1929		
1905	3,000	15,000	1930	*300,017	4,848,661
1906	2,430	14,400	1931		
1907	2,531	28,948	1932		
1908	2,950	32,012	1933	*203,228	3,104,154
1909	500	3,500	1934		
1910	1,843	17,617	1935	*	*
1911	2,194	19,670			
1912	4,129	17,074	Totals	1,302,683	\$18,827,770
1913	8,645	35,968			

* Annual details concealed under 'Unapportioned.'

DOLOMITE

Bibliography: State Mineralogist Reports XV, XVII, XXVII, XXVIII, XXXI.

The 1935 production came from two properties, one each in Inyo and Monterey counties, the annual details are placed under the 'Unapportioned' item to conceal the output of each operator. The 1935 output showed an increase from that of 1934. The material shipped was utilized for steel-furnace flux and refractories, plaster, stucco, dash-coat, terrazzo, art stone, and for manufacture of CO₂.

Dolomite Production of California, by Years.

Previous to the 1915 statistical report of the State Mining Bureau, dolomite was included under limestone, as the two minerals are closely related chemically; but since dolomite, as such, has been found to have certain distinctive applications, we here give it a separate classification.

Amount and value of the output of dolomite, annually, have been as follows :

Year	Tons	Value
1915.....	4,192	\$14,504
1916.....	13,313	46,566
1917.....	27,911	66,416
1918.....	24,560	79,441
1919.....	24,502	67,953
1920.....	42,388	132,791
1921.....	31,195	99,155
1922.....	52,409	114,911
1923.....	69,519	142,615
1924.....	28,843	71,271
1925.....	42,852	104,900
1926.....	68,640	119,313
1927.....	45,976	79,442
1928.....	38,379	85,342
1929.....	58,644	156,928
1930}*	66,564	161,245
1931}*		
1932.....	35,275	40,956
1933.....	54,456	176,575
1934}*	108,645	304,984
1935}*		
Totals.....	938,263	\$2,065,308

* Annual details concealed under 'Unapportioned.'

FELDSPAR

Bibliography: State Mineralogist Reports XV, XVII-XXVIII (inc.), XXX, XXXI. Bulletins 67, 91. U. S. Bureau of Mines, Bulletin 92. Eng. & Min. Jour.-Press, Vol. 115, pp. 535-538, Mar. 24, 1923.

The 1935 feldspar production showed an increase in both amount and value over that of 1934 and is under the 'Unapportioned' item to conceal the output of both operators in San Diego County. The 1933 and 1934 yield amounted to 2655 short tons valued at \$30,611.

Total Feldspar Production in California.

Total amount and value of feldspar production in California since the inception of the industry are given in the following table, by years:

Year	Tons	Value	Year	Tons	Value
1910.....	760	\$5,720	1924.....	9,055	\$68,112
1911.....	740	4,560	1925.....	8,165	59,615
1912.....	1,382	6,180	1926.....	7,300	56,400
1913.....	2,129	7,850	1927.....	10,932	86,101
1914.....	3,530	16,565	1928.....	14,628	93,745
1915.....	1,800	9,000	1929.....	13,327	78,404
1916.....	2,630	14,350	1930.....	5,014	35,654
1917.....	11,792	46,411	1931.....	4,795	59,921
1918.....	4,132	22,061	1932.....	2,294	15,988
1919.....	1,272	12,965	1933}*	2,655	30,611
1920.....	4,518	26,189	1934}*		
1921.....	4,349	28,343	1935.....	*	*
1922.....	4,587	37,109			
1923.....	11,100	81,800	Totals.....	133,886	\$903,649

* Annual details concealed under 'Unapportioned.'

FLUORSPAR

Bibliography: State Mineralogist Reports XVII, XVIII, XXIV, XXVI. Bulletins 67, 91. Eng. & Min. Jour.-Press, Vol. 177, pp. 489-492, Mar. 22, 1924.

There were no shipments of fluorspar reported in California during 1935. The 1934 output came from San Bernardino County. The annual details are combined under the 'Unapportioned' item to conceal the output of a single operator. This material was shipped to steel mills to be used as a flux. The combined production of 1933 and 1934 amounted to a total of 227 tons worth \$3,631.

Fluorspar, or calcium fluoride, CaF_2 , is one of the most important nonmetallic minerals from an industrial standpoint. About 80 per cent of the commercial mineral is prepared in the 'gravel' form and utilized as a flux in the manufacture of steel, for which use no substitute has yet been found.

The California deposits have been reported in Los Angeles, Mono, Riverside and San Bernardino counties. A previous commercial production was made in 1917-1918, when a total of 79 tons valued at \$991 was shipped from Riverside County.

Present quotations (Metal and Mineral Markets) are: not less than 85 per cent CaF_2 and not over 5 per cent SiO_2 , \$16 per ton; No. 2 lamp, \$17.50 per ton.

GEMS

Bibliography: State Mineralogist Reports II, XIV, XV, XVII, XVIII, XX, XXI-XXVIII (inc.), XXX, XXXII (inc.). Bulletins 37, 67, 91. U. S. G. S., 'Mineral Resources of the U. S.'; Bull. 603, p. 208. Bull. Dept. Geo. Univ. of Cal., Vol. 5, pp. 149-153, 331-380. Am. Jour. Sci., Vol. 31, p. 31.

The production of gem materials in California has been somewhat irregular and uncertain since 1911. The compilation of complete statistics is difficult owing to widely-scattered places at which stones are gathered and marketed, for the most part in a small way. The gem material reported in California during 1935 had a total value of \$945. This output came from Butte, Marin, Monterey, Riverside, San Diego, and Santa Clara counties, and consisted of diamonds, jasper, iceland spar, kunzite, tourmaline, and lepidolite. The above showed a decrease as compared with that of 1934 which was worth \$2,456.

Total Production of Gem Materials in California.

The value of the gem output in California annually since the beginning of commercial production is as follows:

Year	Value	Year	Value
1900.....	\$20,500	1919.....	\$5,425
1901.....	40,000	1920.....	36,056
1902.....	162,100	1921.....	10,954
1903.....	110,500	1922.....	1,312
1904.....	136,000	1923.....	13,220
1905.....	148,500	1924.....	4,800
1906.....	497,090	1925.....	10,663
1907.....	232,642	1926.....	9,049
1908.....	208,950	1927.....	7,035
1909.....	193,700	1928.....	22,200
1910.....	237,475	1929.....	26,850
1911.....	51,824	1930.....	3,540
1912.....	23,050	1931.....	5,607
1913.....	13,740	1932.....	4,961
1914.....	3,970	1933.....	690
1915.....	3,565	1934.....	2,456
1916.....	4,752	1935.....	945
1917.....	3,049		
1918.....	650	Total.....	\$2,257,820

GRAPHITE

Bibliography: State Mineralogist Reports XIII. XIV. XV, XVII. XXVI (inc.). XXX. Bulletins 67, 91. U. S. G. S., Min. Res., 1914, Pt. II.

Graphite (also called plumbago) has been produced from time to time in the State, coming principally from Sonoma and Los Angeles counties.

Occurrences of graphite have been reported at various times from Calaveras, Fresno, Imperial, Inyo, Los Angeles, Mendocino, San Bernardino, San Diego, Siskiyou, Sonoma and Tuolumne counties. From 1931 to 1933 there was a small production of graphite from a property in Los Angeles County. The annual details are concealed under 'Unapportioned,' owing to their having been but a single operator.

During 1935 there was a small output of graphite coming from a single property in Los Angeles County. This material was used for experimental purposes. The annual details are concealed under the 'Unapportioned' item to conceal the output of the operator. There was no production of graphite during 1934.

Graphite Production of California, by Years.

According to the records of the State Mining Bureau, the graphite production of California, by years, has been as follows:

Year	Pounds	Value
1901	128,000	\$4,480
1902	84,000	1,680
1903		
1913	2,500	25
1914		
1915		
1916	29,190	2,335
1917		
1918	*770,000	37,225
1919		
1920		
1921		
1922	*624,000	26,160
1923		
1925		
1926	*76,000	13,120
1927		
1928		
1931		
1932	156,000	1,950
1933	*	*
1934		
1935		
Totals	2,269,690	\$86,975

* Annual details concealed under 'Unapportioned,' on account of a single producer.

GYPSUM

Bibliography: State Mineralogist Reports XIV, XV, XVII, XVIII, XXII, XXIII, XXV-XXVIII (inc.), XXX, XXXI. Bulletins 38, 67, 91. U. S. Geol. Surv., Bull. 223, 413, 430, 697. U. S. Bur. of Standards, Circular No. 281.

During the year 1935 there were shipments of gypsum in California amounting to 70,833 short tons valued at \$151,807, coming from three properties in Fresno County, one in Imperial County, and one in Riverside County. This was an increase in both quantity and value over the 1934 output, which was 58,149 tons worth \$113,606.

Total Production of Gypsum in California.

Production of gypsum annually in California since such records have been compiled by this Bureau is as follows:

Year	Tons	Value	Year	Tons	Value
1887	2,700	\$27,000	1913	47,100	\$135,050
1888	2,500	25,000	1914	29,734	78,375
1889	3,000	30,000	1915	20,200	48,953
1890	3,000	30,000	1916	33,384	59,533
1891	2,000	20,000	1917	30,825	56,840
1892	2,000	20,000	1918	19,695	37,176
1893	1,620	14,280	1919	19,813	50,579
1894	2,446	24,584	1920	20,507	92,535
1895	5,158	51,014	1921	37,412	78,875
1896	1,310	12,580	1922	47,084	188,336
1897	2,200	19,250	1923	86,410	289,136
1898	3,100	23,600	1924	25,569	53,210
1899	3,663	14,950	1925	107,613	172,444
1900	2,522	10,088	1926	114,868	211,337
1901	3,875	38,750	1927	94,630	292,090
1902	10,200	53,500	1928	104,790	200,567
1903	6,914	46,441	1929	140,844	396,951
1904	8,350	56,592	1930	116,865	243,507
1905	12,859	54,500	1931	88,354	199,198
1906	21,000	69,000	1932	46,867	93,818
1907	8,900	57,700	1933	59,235	120,451
1908	34,600	155,400	1934	58,149	113,606
1909	30,700	138,176	1935	70,833	151,807
1910	45,294	129,152			
1911	31,457	101,475			
1912	37,529	117,388	Totals	1,709,667	\$4,704,794

LIMESTONE

Bibliography: State Mineralogist Reports IV, XII-XV (inc.), XVII-XXXI (inc.). Bulletins 38, 91. Oregon Agr. College Extension Bulletin 305. Eng. and Min. Jour.-Press, Vol. 120, pp. 249-253.

'Industrial' limestone was produced on 17 properties in ten counties in California during 1935 to the amount of 227,214 short tons valued at \$496,054, being an increase in both amount and value over that of 1934 which was 198,057 tons worth \$481,139. The 1935 yield came from four operators in El Dorado County; three in Santa Clara County; two each in San Bernardino, Santa Cruz, and Tuolumne counties; and one each in Alameda, Fresno, San Luis Obispo, and San Mateo counties.

The amount here given does not include the limestone used in the manufacture of cement nor for macadam and concrete, nor of lime for building purposes; but accounts for that utilized as a smelter and foundry flux, for glass and sugar making, and other special chemical and manufacturing processes. It also includes that utilized for fertilizers (agricultural 'lime'), 'roofing gravel,' paint and concrete filler, whitening for paint, putty, kalsomine, terrazzo, paving dust, chicken grit, carbon dioxide gas, 'paving compound,' facing dust for concrete pipe, also for rubber and magnesite mix. The material from Fresno County was marl; and that from Alameda, San Mateo and Santa Clara counties was shells, dredged from San Francisco Bay, which was ground and used for agricultural purposes and poultry grit. Of the total 'industrial' limestone produced in 1935 approximately \$35,933 tons valued at \$128,233, were used for agricultural purposes and poultry grit.

Distribution of the 1935 output of limestone was as follows:

<i>County</i>	<i>Tons</i>	<i>Value</i>
El Dorado -----	151,814	\$298,867
Santa Clara ^b -----	30,613	71,381
Alameda, ^b Fresno, ^a San Bernardino, San Luis Obispo, San Mateo, ^b Santa Cruz, Tuolumne *-----	44,787	125,806
Totals -----	227,214	\$496,054

* Combined to conceal the output of individual operators in each.

^a Includes marl.

^b Includes shells.

Limestone Production of California, by Years.

The following tabulation gives the amounts and value of 'industrial' limestone produced in California by years since 1894 when compilation of such records was begun by the State Mining Bureau. These tonnages consist principally of limestone utilized for flux, glass and sugar making, agricultural, chemical, and other special industrial purposes. That utilized in cement manufacture is not included:

Year	Tons	Value	Year	Tons	Value
1894.....	15,420	\$19,275	1916.....	187,521	\$217,733
1895.....	71,355	71,690	1917.....	237,279	356,396
1896.....	68,184	71,112	1918.....	208,566	456,258
1897.....	36,796	38,556	1919.....	88,291	248,145
1898.....	27,686	24,518	1920.....	90,120	298,197
1899.....	30,769	29,185	1921.....	75,921	305,912
1900.....	32,791	31,532	1922.....	81,382	282,181
1901.....	76,937	99,445	1923.....	143,266	348,464
1902.....	71,422	90,524	1924.....	219,476	582,660
1903.....	125,919	163,988	1925.....	319,977	494,525
1904.....	40,207	87,207	1926.....	108,795	367,501
1905.....	192,749	323,325	1927.....	699,790	663,957
1906.....	80,262	162,827	1928.....	127,895	397,935
1907.....	230,985	406,041	1929.....	168,315	557,617
1908.....	273,890	297,264	1930.....	169,477	508,751
1909.....	337,676	419,921	1931.....	177,268	560,699
1910.....	684,635	581,208	1932.....	168,950	487,788
1911.....	516,398	452,790	1933.....	207,371	487,712
1912.....	613,375	570,248	1934.....	198,057	461,139
1913.....	301,918	274,455	1935.....	227,214	496,054
1914.....	572,272	517,713			
1915.....	146,324	156,288	Totals.....	8,454,901	\$13,457,766

LITHIA

Bibliography: State Mineralogist Reports II, IV, XIV, XXI, XXX. Bulletins 38, 67, 91.

Lithia mica, lepidolite (a silicate of lithium and others), utilized in the manufacture of artificial mineral water, fireworks, glass, etc., has been mined in San Diego County since 1899, except between 1905 and 1915, though there was none shipped in 1923, 1925, 1929-1935 (inc.). During 1930 there was a small amount of lepidolite mined in California, but none shipped. Some amblygonite, a lithium phosphate, is occasionally also obtained from poekets associated with the gem tourmalines.

Lithia mica total production in the State has been as follows:

Year	Tons	Value	Year	Tons	Value
1899.....	124	\$4,600	1920.....	10,046	\$153,502
1900.....	440	11,000	1921.....	*1,365	20,781
1901.....	1,100	27,500	1922.....		
1902.....	822	31,880	1923.....		
1903.....	700	27,300	1924.....	109	2,269
1904.....	641	25,000	1925.....		
1905.....	25	276	1926.....		
1906.....			1927.....	*550	13,900
1915.....	91	1,365	1928.....		
1916.....	71	1,065	1929.....		
1917.....	880	8,800			
1918.....	4,111	73,998	Totals.....	21,875	\$417,636
1919.....	800	14,400			

* Annual details concealed under 'Unapportioned.'

MICA

Bibliography: State Mineralogist Reports II, IV, XXVI-XXVIII (inc.), XXX. Bulletins 38, 67, 91. U. S. Geol. Surv., Bull. 740; Min. Res. of U. S. Eng. & Min. Jour.-Press, Vol. 115, pp. 55-60, Jan. 13, 1923.

Sericite, a fine-grained variety of muscovite, has been produced continuously since 1929 in California, though there was no production of mica during 1934. The 1935 output came from a single property in Imperial County. The annual details are concealed in the 'Unappor-

tioned' item so as not to reveal production of the operator. This type of material is used as a cheap grade of ground mica for roofing as a refractory, foundry facing, and decorative material to imitate snow.

Production of mica in California has been as follows:

Year	Tons	Value
1902	50	\$2,500
1903	50	3,800
1904	50	3,000
1929		
1930	2,240	15,260
1931		
1932		
1933	1,957	13,963
1934	*	*
1935		
Totals	4,347	\$38,523

* Annual details concealed under 'Unapportioned.'

MINERAL PAINT

Bibliography: State Mineralogist Reports XII-XIX (inc.), XXI, XXII-XXVIII (inc.). Bulletins 38, 91.

During 1935 there was a small amount of mineral paint produced in California, which came from a single property in Placer County. The details are concealed under 'Unapportioned' so as not to reveal individual output. There was no production in 1934.

These materials have come from Alameda, Amador, Butte, Calaveras, Colusa, Los Angeles, Napa, Nevada, Placer, Riverside, Shasta, Sonoma, Stanislaus and Ventura counties. There are also other deposits that may have possible commercial value, but as yet there have been no commercial shipments from El Dorado, Imperial, Kern, Kings, Lake, Mendocino, San Diego, Siskiyou, Trinity and Yuba counties, in which they are found.

Mineral Paint Production of California, by Years.

The first recorded production of mineral paint materials in the State was in the year 1890. The output, showing annual amount and value since that time, is given herewith:

Year	Tons	Value	Year	Tons	Value
1890	40	\$480	1914	132	\$847
1891	22	880	1915	311	1,756
1892	25	750	1916	643	3,960
1893	590	26,795	1917	520	2,700
1894	610	14,140	1918	728	4,738
1895	750	8,425	1919	1,780	17,055
1896	395	5,540	1920	779	8,477
1897	578	8,165	1921	446	4,748
1898	653	9,698	1922	1,620	13,277
1899	1,704	20,294	1923	1,049	11,773
1900	529	3,993	1924	532	5,234
1901	325	875	1925	669	6,969
1902	589	1,533	1926	569	5,846
1903	2,370	3,720	1927		
1904	270	1,985	1928	919	9,592
1905	754	4,025	1929	467	2,820
1906	250	1,720	1930	250	3,000
1907	250	1,720	1931		
1908	335	2,250	1932	*	*
1909	305	2,325	1933		
1910	200	2,040	1934	*	*
1911	186	1,184	1935		
1912	300	1,800			
1913	303	1,780	Totals	23,147	\$223,098

* Annual details concealed under 'Unapportioned.'

MINERAL WATER

Bibliography: State Mineralogist Reports VI, XII-XVIII (inc.), XXI-XXIX (inc.), XXXI, XXXII. U. S. G. S., Water Supply Paper 338. Min. Res., 1914, 1916. 'Mineral Springs and Health Resorts of California,' by Dr. Winslow Anderson, 1890. U. S. Dept. of Agr., Bur. of Chem., Bulletin 91.

A widespread production of mineral water is shown annually in California. These figures refer to mineral water actually bottled for sale, or for local consumption. Water from some of the springs having a special medicinal value brings a price many times higher than the average shown, while in some cases the water is used merely for drinking purposes and sells for a nominal figure. Health and pleasure resorts are located at many of the springs. The waters of some of the hot springs are not suitable for drinking, but are very efficacious for bathing. From a therapeutic standpoint, California is particularly rich in mineral springs.

The commercial production of mineral water during 1935 amounted to 16,659,254 gallons valued at \$940,333, as compared with 19,882,436 gallons worth \$1,071,197 in 1934. The 1935 output came from springs on 36 properties in 17 counties and was distributed as follows:

<i>County</i>	<i>Gallons</i>	<i>Value</i>
Lake -----	22,410	\$13,909
Los Angeles -----	7,379,521	647,416
Napa -----	38,000	3,650
Sonoma -----	24,747	4,295
Butte, Calaveras, Contra Costa, El Dorado, Marin, Orange, Riverside, San Bernardino, San Diego, San Francisco, San Luis Obispo, Santa Barbara, Siskiyou * -----	9,214,849	271,063
Totals -----	16,659,254	\$940,333

* Combined to conceal the output of operators in each.

The production above tabulated either came from springs or artesian wells, and was bottled, in part with artificial carbonation, but mostly natural, and sold for drinking purposes. A large part was used in the preparation of soft drinks with flavors.

Mineral Water Production of California, by Years.

Mineral water was bottled for sale, at the Napa Soda Springs, Napa County, as early as 1856,¹ and at other springs in California, notably The Geysers, Sonoma County, also at early dates; but there are no figures available earlier than the year 1887. Amounts and values, annually, since that year are shown herewith:

¹ Cronise, T. F., The natural wealth of California, p. 182, 1868.

Year	Gallons	Value	Year	Gallons	Value
1887.....	618,162	\$144,368	1913.....	2,350,792	\$599,748
1888.....	1,112,202	252,990	1914.....	2,443,572	476,169
1889.....	808,625	252,241	1915.....	2,274,267	467,738
1890.....	258,722	89,786	1916.....	2,273,817	410,112
1891.....	334,553	139,959	1917.....	1,942,020	340,566
1892.....	331,875	162,019	1918.....	1,808,791	375,650
1893.....	383,179	90,667	1919.....	2,233,842	340,117
1894.....	402,275	184,481	1920.....	2,391,791	421,643
1895.....	701,397	291,500	1921.....	3,446,278	367,476
1896.....	808,843	337,434	1922.....	4,276,346	486,424
1897.....	1,508,192	345,863	1923.....	5,487,276	616,919
1898.....	1,429,809	213,817	1924.....	8,159,211	818,726
1899.....	1,338,537	406,691	1925.....	12,115,072	1,230,455
1900.....	2,456,115	268,607	1926.....	14,074,877	1,171,550
1901.....	1,555,328	559,057	1927.....	16,644,423	1,487,183
1902.....	1,701,142	612,477	1928.....	25,049,002	1,304,969
1903.....	2,056,340	558,201	1929.....	27,032,083	2,040,615
1904.....	2,430,320	496,946	1930.....	37,354,111	2,870,663
1905.....	2,194,150	538,700	1931.....	26,164,331	1,347,860
1906.....	1,585,690	478,186	1932.....	19,031,224	1,495,988
1907.....	2,924,269	544,016	1933.....	15,650,406	719,746
1908.....	2,789,715	560,507	1934.....	19,882,436	1,071,197
1909.....	2,449,834	465,488	1935.....	16,659,254	940,333
1910.....	2,335,259	622,009			
1911.....	2,637,669	590,654			
1912.....	2,497,794	529,384	Totals.....	308,395,218	\$31,127,894

PHOSPHATES

Bibliography: State Mineralogist Report XXI. Bulletins 67, 91.

No commercial production of phosphates has been recorded from California, though occasional pockets of the lithium phosphate, amblygonite, Li (AlF) PO_4 , have been found associated with the gem tourmaline deposits in San Diego County. Such production has been classified under lithia.

PUMICE and VOLCANIC ASH

Bibliography: State Mineralogist Reports XII, XIV, XV, XVII, XVIII, XXII-XXVIII (inc.), XXX-XXXII (inc.). Bulletin 38. U. S. Bureau of Mines I. G. 6560. (See 'Tufa.')

The production of pumice and volcanic ash in California during the year 1935 amounted to 14,890 short tons valued at \$87,055, coming from three properties in Inyo County and one each in Imperial, Kern, Madera, Mono, Napa, San Luis Obispo, and Siskiyou counties. The 1935 output showed an increase in quantity and value over that of 1934, which was 9,951 tons worth \$54,248.

The material from two of the deposits in Inyo County and from Imperial, Mono, Napa, and Siskiyou counties was 4,492 tons of pumice; this was used in acoustic plaster, light-weight aggregate in concrete, for abrasive purposes, and for chicken-house litter. The product from one property in Inyo and those from Kern, Madera and San Luis Obispo counties was 10,398 tons of volcanic ash or tuff variety and was employed in making soap, cleanser compounds, a large tonnage being utilized as a concrete filler in cement displacement, and in asphalt and as a carrier for dry agricultural sprays. The Kern County

ash is going into the preparation of one of our popular and nationally advertised brands of cleanser compounds.

Pumice Production of California, by Years.

Commercial production of pumice in California was first reported to the State Mining Bureau in 1909, then not again until 1912, since which year there has been a small annual output, as indicated by the following table:

Year	Tons	Value	Year	Tons	Value
1909.....	50	\$500	1924.....	4,919	\$33,404
1910.....			1925.....	5,319	32,937
1911.....			1926.....	7,170	48,350
1912.....	100	2,500	1927.....	13,779	168,896
1913.....	3,590	4,500	1928.....	10,440	105,055
1914.....	50	1,000	1929.....	10,449	76,123
1915.....	380	6,400	1930.....	12,947	128,847
1916.....	1,246	18,092	1931.....	11,711	108,130
1917.....	525	5,295	1932.....	9,891	86,034
1918.....	2,114	28,669	1933.....	8,243	61,067
1919.....	2,388	43,657	1934.....	9,951	54,748
1920.....	1,537	25,890	1935.....	14,890	87,055
1921.....	406	6,310			
1922.....	613	4,248	Totals.....	135,644	\$91,154,016
1923.....	2,936	16,309			

PYRITES

Bibliography: State Mineralogist Reports XVIII, XIX, XXII, XXV, XXVI, XXX. Bulletins 38, 91. Min. and Sci. Press, Vol. 144, pp. 825, 840.

Pyrite shipped in California during 1935 came from a single property in Shasta County, while that for 1934 came from two properties, one each in Alameda and Shasta counties. The 1935 production showed an increase in both quantity and value over that of 1934. The annual details are placed under 'Unapportioned' to conceal the output of individual operators.

This material was mostly used in the manufacture of sulphuric acid for explosives and fertilizer. Some iron sulphate had been produced previously and was utilized directly in the preparation of an agricultural fertilizer and insecticide. The sulphur content ranged up to 50.8% S.

This does not include the large quantities of pyrite, chalcopyrite, and other sulphides which are otherwise treated for their valuable metal contents. Some sulphuric acid is annually made as a by-product in the course of roasting certain tonnages of Mother Lode auriferous concentrates while under treatment for their precious metal values.

Pyrites Production in California, by Years.

The total recorded pyrites production in California to date is as follows:

Year	Tons	Value	Year	Tons	Value
1898	6,000	\$30,000	1918	128,329	\$425,012
1899	5,400	28,620	1919	147,024	540,300
1900	3,642	21,133	1920	146,001	530,581
1901	4,578	18,429	1921	110,025	473,735
1902	17,525	60,306	1922	151,381	570,425
1903	24,311	94,000	1923	148,004	555,308
1904	15,043	62,992	1924	124,214	517,835
1905	15,503	63,958	1925	129,500	528,550
1906	46,689	145,895	1926	100,896	466,088
1907	82,270	251,774	1927	130,910	564,823
1908	107,081	610,335	1928	90,566	400,627
1909	457,867	1,389,802	1929	79,169	363,717
1910	42,621	179,862	1930	39,958	194,228
1911	54,225	182,954	1931	25,402	131,174
1912	69,872	203,470	1932)*	72,271	297,832
1913	79,000	218,537	1933)*		
1914	79,267	230,058	1934)*	157,129	547,754
1915	92,462	293,148	1935)		
1916	120,525	372,969	Totals	3,214,985	\$11,889,985
1917	111,325	323,704			

* Annual details concealed under 'Unapportioned'.

SHALE OIL

Bibliography: State Mineralogist Report XIX. U. S. Geol. Surv., Bulletins 322, 729. U. S. Bur. of Mines, Bull. 210. Eng. and Min. Jour.-Press, Vol. 118, No. 8, pp. 290-292, Aug. 23, 1924. Chem. & Met. Eng., Vol. 32, No. 6, Feb., 1925. Min. Congress Jour., Dec., 1924.

Two plants on a more or less experimental scale operated for six years in California, with commercial production beginning in a small way in 1922. The product, in part, was sold for utilization as a flotation oil in metallurgical work, and part consumed as fuel at the plants. There was no production reported for 1935.

Shale Oil Production of California, by Years

Year	Barrels	Value
1922)*		
1923}	4,333	\$44,262
1924)*		
1925}	8,688	55,240
1926)*		
1927}	8,819	9,998
1928}		
Totals	21,840	\$109,500

* Annual details concealed under 'Unapportioned.'

SILICA (Sand and Quartz)

Bibliography: State Mineralogist Reports IX, XIV, XV, XVII, XVIII, XX-XXVIII (inc.), XXXI, XXXII. Bulletins 38, 67, 91.

We combine these materials because of the overlapping roles of vein quartz which is mined for use in glass making and as an abrasive, and that of silica sand which, although mainly utilized in glass manufacture, also serves as an abrasive. Both varieties are also utilized to some extent in fire-brick manufacture.

We do not include under this heading such forms of silica as: quartzite, sandstone, flint, tripoli, diatomaceous earth, nor the gem forms of 'rock crystal,' amethyst, and opal. Each of these has various industrial uses, which are treated under their own designations.

The production of silica in California during the year 1935 amounted to 70,835 short tons valued at \$297,272 f.o.b. rail-shipping point and came from two properties each in Contra Costa and San Diego counties and one each in El Dorado, Orange, Placer, and Riverside. The above was an increase in both amount and value as compared with the 1934 output of 70,432 tons worth \$296,643. The 1935 output consisted of 69,756 tons of glass sand and 1,079 tons of vein or boulder quartz. In addition to the above output for 1935 there were several thousand tons of quartzite shipped from San Bernardino County to be used in the manufacture of silica brick. To avoid duplication, its amount and value is not added to the silica totals.

The glass sand came from Contra Costa, Orange and Riverside counties. For making the higher grades of glass, deposits in Contra Costa County are replacing the sand imported from Belgium. Belgium sand has displaced local material in the manufacture of sodium silicate ('water glass'). There are various deposits of quartz in California which could be utilized for glass making, but to date they have not been so used owing to the cost of grinding and the difficulty of preventing contamination by iron while grinding.

Silica sand has been produced in the following counties of the State: Alameda, Amador, Contra Costa, El Dorado, Imperial, Inyo, Los Angeles, Mariposa, Mono, Monterey, Orange, Placer, Riverside, San Diego, San Joaquin and Tulare, the chief centers being Contra Costa, Amador, Monterey and Los Angeles counties. The industry is of limited importance, so far, because of the fact that much of the available material is not of a grade which will produce first-class colorless glass; for such, it must be essentially iron-free. Even a fractional per cent of iron imparts a green color to the glass.

The Tariff Act of June 21, 1930, placed a duty on sand, containing 95 per cent or more of *Silica* and not more than six-tenths of 1 per cent of oxide of iron and suitable for use in the manufacture of glass, of \$2 per ton.

Total Silica Production in California.

Total silica production in California since the inception of the industry, in 1899, is shown below, being mainly sand:

Year	Tons	Value	Year	Tons	Value
1899.....	3,000	\$3,500	1919.....	18,659	\$101,600
1900.....	2,200	2,200	1920.....	25,324	96,793
1901.....	5,000	16,250	1921.....	10,569	49,179
1902.....	4,500	12,225	1922.....	9,874	31,016
1903.....	7,725	7,525	1923.....	7,964	30,420
1904.....	10,004	12,276	1924.....	6,808	35,006
1905.....	9,257	8,121	1925.....	12,498	96,780
1906.....	9,750	13,375	1926.....	30,010	104,317
1907.....	11,065	8,178	1927.....	24,636	94,762
1908.....	9,255	22,045	1928.....	14,814	66,679
1909.....	12,259	25,517	1929.....	18,686	79,210
1910.....	19,224	18,265	1930.....	17,802	71,380
1911.....	8,620	8,672	1931.....	43,330	182,769
1912.....	13,075	15,404	1932.....	33,997	136,324
1913.....	18,618	21,899	1933.....	70,329	266,520
1914.....	28,538	22,688	1934.....	70,432	296,643
1915.....	28,904	34,322	1935.....	70,835	297,272
1916.....	20,880	48,908			
1917.....	19,376	41,166			
1918.....	23,257	\$88,930	Totals.....	751,074	\$2,457,136

SILLIMANITE-ANDALUSITE-KYANITE GROUP

Bibliography: State Mineralogist Reports XX, XXIII, XXIV, XXVII. Bulletins 67, 91. Dana's Mineralogy. U. S. Geol. Surv., Prof. Paper 110. U. S. Bureau of Mines, Inform. Circ. 6255. Eng. & Min. Jour.-Press, Vol. 120, pp. 91-94, 1925. Amer. Mineralogist, June, 1924.

Sillimanite and andalusite are both aluminum silicates (Al_2SiO_5), having the same composition and formula, but with slightly different physical characteristics. Though both crystallize in the orthorhombic system, their crystal habits are different. A massive deposit of andalusite, found in Dry Creek Canyon in the White Mountains of the Inyo Range, in Mono County, is being mined by the Champion Spark Plug Company of Detroit, Michigan. The material is shipped East and utilized in the manufacture of porcelain for automobile spark plugs, for other high-tension electric insulators, laboratory ware and porcelain. Porcelain made from these minerals can be subjected to sudden and extreme changes in temperature without damage.

Kyanite is also an aluminum silicate (Al_2SiO_5), of the same chemical composition as andalusite and sillimanite, but crystallizing in the triclinic system. A deposit of kyanite is being mined in Imperial County, near Ogilby, by the Vitrefrax Corporation and shipments made to their refractory plant in Los Angeles.

Dumortierite, though different somewhat in composition from the above, being a basic aluminum silicate ($\text{HAl}_6\text{BSi}_3\text{O}_{20}$), has proved similar in behavior in ceramic work so that it is now being mixed with andalusite for electrical porcelains. A deposit of this mineral in Nevada is being mined for that purpose. Occurrences of massive dumortierite are known in Imperial and San Diego counties in this State and there may yet be some commercial possibilities for them.

Total Sillimanite Group Production of California, by Years

Year	Tons	Value
1922		
1923	4,584	\$98,790
1924		
1925		
1926	4,810	203,000
1927		
1928	4,276	76,000
1929		
1930	4,359	198,893
1931		
1932	1,244	21,800
1933		
1934	3,035	69,026
1935	*	*
Totals	22,308	\$667,509

* Annual details concealed under 'Unapportioned.'

SOAPSTONE and TALC

Bibliography: State Mineralogist Reports XII, XIV, XV, XVII-XXVII (inc.), XXX. Bulletins 38, 67, 91. U. S. Bur. of Mines, Bulletin 213. Rep. of Investigations, Serial No. 2253, May, 1921.

The total output of talc and soapstone in California during 1935 amounted to 17,332 short tons valued at \$170,830. The 1935 figures

showed an increase in both amount and value over those of 1934, which were 13,920 tons and \$158,606. Of the 1935 production 16,541 tons were high-grade tale from Inyo and San Bernardino counties; this material was utilized mainly in toilet powder, paint, paper and rubber manufacture, and in ceramics. The remainder of 791 tons was soapstone and came from Butte and El Dorado counties.

The 'soapstone' grades were used mainly for roofing granules and as a filler in roofing paper, and part also in magnesite cement.

It is reported that California tale has replaced to some extent imported tale in the toilet trade on the basis of quality. The largest production of tale in the United States comes from Vermont and New York, and of massive soapstone from Virginia.

During 1935 imports of tale, steatite, etc., into the United States totaled 23,897 short tons valued at \$492,274, as compared with 22,921 tons worth \$368,014 during 1934, according to the United States Bureau of Foreign and Domestic Commerce.

The Tariff Act of 1930 places a duty on tale, steatite or soapstone and French chalk, crude or unground, of one-fourth of one cent per pound.

Talc Production of California, by Years.

Production was intermittent in the State up to 1912; but there has been a material growth since 1916, as shown in the following table:

Year	Tons	Value	Year	Tons	Value
1893.....	400	\$17,750	1916.....	1,703	\$9,831
1894.....			1917.....	5,267	45,279
1895.....	25	375	1918.....	11,760	85,534
1896.....			1919.....	8,764	115,091
1897.....			1920.....	11,327	221,362
1898.....			1921.....	8,752	130,078
1899.....			1922.....	13,378	197,186
1900.....			1923.....	17,439	252,661
1901.....	10	119	1924.....	16,179	242,770
1902.....	14	288	1925.....	15,465	239,084
1903.....	219	10,124	1926.....	17,004	255,645
1904.....	228	2,315	1927.....	16,218	164,744
1905.....	300	3,000	1928.....	18,668	251,372
1906.....			1929.....	18,676	193,493
1907.....			1930.....	15,861	154,258
1908.....	3	48	1931.....	13,472	109,940
1909.....	33	280	1932.....	10,690	122,880
1910.....	740	7,260	1933.....	14,451	153,668
1911.....			1934.....	13,920	158,606
1912.....	1,750	7,350	1935.....	17,332	170,830
1913.....	1,350	6,150			
1914.....	1,000	4,500	Totals.....	274,061	\$3,348,621
1915.....	1,663	14,750			

STRONTIUM

Bibliography: State Mineralogist Report XXVI, XXVII, Bulletins 67, 91. U. S. G. S. Bull. 540; 660-I.

There has been no production of strontium minerals in California since 1918, though in that year both celestite (SrSO₄), and the carbonate, strontianite (SrCO₃) were shipped. The first recorded commercial output of strontium minerals in California was in 1916. The occurrence of the carbonate is particularly interesting and valuable, as it appears to be the only considerable deposit of commercial importance so far opened up in the United States. Shipments reported as averag-

ing 80% SrCO₃ have been made. The deposit is associated with deposits of barite near Barstow, San Bernardino County. The carbonate has also been found in massive form near Shoshone, Inyo County. In addition to Imperial County, celestite is found near Calico and Ludlow, and in the Avawatz Mountains in San Bernardino County, but as yet undeveloped.

Production of strontium minerals in California, by years, has been as follows:

Year	Tons	Value
1916 -----	57	\$2,850
1917 -----	3,050	37,000
1918 -----	2,900	33,000
1919 -----		
Totals-----	6,007	\$72,850

SULPHUR

Bibliography: State Mineralogist Reports IV, XIII, XIV, XXV. Bulletins 38, 67, 91.

During 1935 there was a single producer of sulphur in California, the material coming from Inyo County. The annual details are concealed in the 'Unapportioned' item so as not to reveal the output of the operator.

In 1934 the production was 4,412 short tons valued at \$67,656, which came from two properties in Inyo County and one in Alpine County. The 1934 output of sulphur was the largest annual recorded in this State.

The 1929-1931 output, which came from Colusa County, and was utilized in the manufacture of a fertilizer and for dusting for mildew. These were the commercial operation of mining sulphur. The last previous production was in 1923 and 1924 and came from Kern County. This mineral has been found to some extent in Alpine, Colusa, Imperial, Inyo, Kern, Lake, Sonoma, Tehama, and Ventura counties.

Total Production of Sulphur in California.

Sulphur was produced at the famous Sulphur Bank mine in Lake County, during the years 1865-1868 (inc.); following which the property became more valuable for its quicksilver. The Elgin quicksilver mine, near Wilbur Springs, Colusa County, is a similar occurrence.

Production of sulphur in California to date:

Year	Tons	Value
1865} -----		
1866} * -----	941	\$53,500
1867} -----		
1868 to 1922-----	-----	-----
1923} * -----	185	4,071
1924} -----		
1925 to 1928-----	-----	-----
1929} -----		
1930} * -----	265	9,025
1931} -----		
1932} * -----	1,991	32,838
1933} -----		
1934 -----	4,412	67,656
1935 -----	*	*
Totals-----	7,794	\$167,090

* Annual details concealed under 'Unapportioned.'

WOLLASTONITE

During 1935 there were no commercial shipments of wollastonite reported in California. In 1934 there was production coming from a single property in Kern County. The annual details are concealed in the 'Unapportioned' item so as not to reveal the output of the single operator.

The first commercial production of wollastonite was made in 1933 from a deposit operated by John T. Thorndyke in the Radmacher District in Kern County, and was shipped from Code's Siding to Los Angeles, where it is used to manufacture mineral wool. This is being done by a new process in an electric furnace where the material is melted without the use of a flux and then blown to a fine fiber or wool by compressed air from jets. The mineral wool is an excellent insulating material for sound, heat and cold, and the manufacturer expects to use large quantities in the proposed steel houses. This material, also, can be used in the manufacture of unbreakable glass. This is the first recorded commercial production of wollastonite in California, and apparently also the first in the United States.

Wollastonite is a calcium metasilicate (CaSiO_3) and usually found in crystalline limestone at the contact with intrusive igneous rocks. It is a white to gray mineral, having a hardness of $4\frac{1}{2}$ to 5 and a specific gravity of about 2.9.

CHAPTER SIX

SALINES

Bibliography: State Mineralogist Reports III, XIV, XV, XVII-XXIX (inc.). Bulletin 24. Spurr and Wormser, "Marketing of Minerals." "Non-Metallic Minerals," by R. B. Ladoo. See also under each substance.

Under this heading are included borax, common salt, soda, potash, and other alkiline salts. The first two have been produced in a number of localities in California, more or less regularly since the early sixties. Except for a single year's absence, soda has had a continuous production since 1894. Potash, magnesium chloride and sulphate, and calcium chloride have been added to the commercial list in recent years, joined in 1926 by bromide, and in 1931 by iodine. The nitrates are still prospective.

Our main resources of salines are the lake beds of the desert regions of Imperial, Inyo, Kern, Los Angeles, San Bernardino, and San Luis Obispo counties, and the waters of the Pacific Ocean.

The total value of this group showed a decrease from \$10,413,019 in 1934 to \$9,700,802 in 1935. The following table gives details for the years 1934 and 1935:

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Borates.....	240,696 tons	\$5,524,262	280,249 tons	\$4,602,064	\$922,198—
Iodine.....	355,279 lbs.	423,016	*	*	*—
Magnesium salts.....	2,325 tons	194,642	2,795 tons	235,531	40,889+
Salt.....	332,194 tons	1,222,810	365,711 tons	1,230,480	7,670+
Soda.....	99,380 tons	1,219,561	125,504 tons	1,341,045	121,484+
Unapportioned.....		^a 1,828,728		^b 2,291,682	462,954+
Total values.....		\$10,413,019		\$9,700,802	
Net decrease.....					\$712,217—

* Included under 'Unapportioned.'

^a Includes bromine, calcium chloride and potash.

^b Includes bromine, calcium chloride, iodine and potash.

BORATES

Bibliography: State Mineralogist Reports III, X, XII-XV (inc.), XVII-XXIX (inc.), XXV-XXVII (inc.). Bulletins 24, 67, 91.

During the year 1935 there was produced in California a total of 263,915 short tons of borate materials, compared with 240,732 short tons for 1934.

The material shipped during the year included the new sodium borates, kernite (rasorite) and kramerite from Kern County; also crystallized borax prepared by evaporation of brines at Searles lake in San Bernardino County and Owens Lake in Inyo County.

As the crude ore is not sold as such, but is almost entirely calcined before shipping to the refinery for conversion into the borax of commerce, and because of the fact that the material varied widely in boric acid content, we have recalculated the tonnage to a basis of 40 per cent, A. B. A. This is approximately the average A. B. A. content of the colemanite material after calcining, and also of the crystallized borax obtained from evaporation of the lake brines.

Recalculated as above, the 1935 production totaled 280,249 short tons valued at \$4,602,046. This was an increase in quantity with a decreased value as compared with the 1934 output of 240,696 tons worth \$5,524,262.

The total amount of borates exported from the United States during 1935 according to the U. S. Bureau of Foreign and Domestic Commerce,¹ was 114,447 short tons valued at \$3,242,350, as compared with 103,643 tons worth \$2,997,276 in 1934.

Total Production of Borate Materials in California.

Borax was first discovered in California in the waters of Tusean Springs in Tehama County, January 8, 1856. Borax Lake in Lake County was discovered in September of the same year by Dr. John A. Veach. This deposit was worked in 1864-1868, inclusive, and during that time produced 1,181,365 pounds of refined borax. The bulk of it was exported by sea to New York. This was the first commercial output of this salt in the United States, and California is still today the leading American producer of borax, having been for many years the sole producer.

Production from the dry lake 'playa' deposits of Inyo and San Bernardino counties began in 1873; but it was not until 1887 that the borax industry was revolutionized by the discovery of the colemanite beds at Calico, in San Bernardino County and later similar beds in Inyo and Los Angeles counties. The colemanite deposits of Ventura County were not worked extensively, owing to lack of transportation facilities. Some production of colemanite has been made from deposits opened up in Clarke County, Nevada. Colemanite was in turn, displaced by the discovery in 1926 of kernite (rasorite) a sodium borate, near Kramer in Kern County.

The total production of borate materials in California is shown in the following table:

¹ Monthly Summary of Foreign Commerce of the United States, Department of Commerce, Dec., 1935.

Total Production of Borate Materials in California

Year	Tons	Value	Year	Tons	Value
1864	12	\$9,478	1901	22,221	\$982,380
1865	126	94,099	1902	17,202	2,234,994
1866	201	132,538	1903	34,430	661,400
1867	220	156,137	1904	45,647	698,810
1868	32	22,384	1905	46,334	1,019,158
1869			1906	58,173	1,182,410
1870			1907	53,413	1,200,913
1871			1908	22,200	1,117,000
1872	140	89,600	1909	16,628	1,163,960
1873	515	255,440	1910	16,828	1,177,960
1874	915	259,427	1911	50,945	1,456,672
1875	1,168	289,080	1912	42,135	1,122,713
1876	1,437	312,537	1913	58,051	1,491,530
1877	993	193,705	1914	62,500	1,483,500
1878	373	66,257	1915	67,004	1,663,521
1879	364	65,443	1916	103,523	2,409,375
1880	609	149,245	1917	109,944	2,561,958
1881	690	189,750	1918	88,772	1,867,908
1882	732	201,300	1919	66,791	1,717,192
1883	900	265,500	1920	127,065	2,794,206
1884	1,019	198,705	1921	50,136	1,096,326
1885	942	155,430	1922	39,087	1,068,025
1886	1,285	173,475	1923	62,667	1,893,798
1887	1,015	116,689	1924	52,070	1,599,149
1888	1,405	196,636	1925	46,124	1,526,938
1889	965	145,473	1926	47,605	1,625,298
1890	3,201	480,152	1927	72,462	3,043,260
1891	4,267	640,000	1928	109,722	3,378,552
1892	5,525	838,787	1929	144,678	3,312,085
1893	3,955	593,292	1930	209,869	3,686,817
1894	5,770	807,807	1931	206,405	5,753,037
1895	5,959	595,900	1932	179,356	2,856,470
1896	6,754	675,400	1933	197,495	3,019,513
1897	8,000	1,080,000	1934	240,696	5,524,262
1898	8,300	1,153,000	1935	280,249	4,602,064
1899	20,357	1,139,882			
1900	25,837	1,013,251	Totals	3,162,410	\$86,748,953

1 Refined borax. 2 Recalculated to 40% 'anhydrous boric acid' equivalent beginning with 1922.

BROMINE

The first commercial production of bromine and bromine compounds was begun during 1926 by the California Chemical Corporation in its plant at Chula Vista, San Diego County, from salt works bittern waters. This same plant has been recovering magnesium chloride for a number of years. Bromine is also now being made at a similar bittern-water plant at Newark, Alameda County. The 1935 output showed an increased value with a slight decrease in amount as compared with 1934 production; annual details of which are concealed under the 'Unapportioned' item to conceal the production of the single company which operated both plants.

The total commercial production of bromine in California is as follows:

Year	Tons	Value
1926		
1927	158	\$120,480
1928		
1929		
1930	802	552,933
1931		
1932		
1933	559	146,547
1934	*	*
1935		
Totals	1,519	\$819,960

* Annual details concealed under 'Unapportioned.'

CALCIUM CHLORIDE

Bibliography: U. S. Geol. Surv., Min. Res. 1919, Pt. 11. Engineering and Contracting, Roads and Streets, monthly issue, Feb. 6, 1924. 'How to Maintain Roads,' manual of instruction of Dow Chemical Company.

Calcium chloride is hygroscopic, that is, it has an affinity for water. This property is taken advantage of by utilizing this salt as a drying agent. During 1935 the production of calcium chloride in California came from one plant in San Bernardino County. The annual details are combined under the 'Unapportioned' item to conceal the output of the operator.

Total Calcium Chloride Production in California.

Commercial production of calcium chloride in California was first reported to the State Mining Bureau in 1921, from two plants in San Bernardino County, being obtained as a by-product in the refining of salt from deposits in certain of the desert dry lakes. Total production in California is shown in the following tabulation:

Year	Tons	Value
1921.....	683	\$22,980
1922)•.....		
1923)•.....	1,204	26,580
1924)•.....		
1925)•.....	10,988	328,876
1926)•.....		
1927)•.....	34,195	508,748
1928)•.....		
1929)•.....	12,020	114,080
1930)•.....		
1931)•.....	9,688	103,237
1932)•.....		
1933)•.....	3,103	15,500
1934)•.....	4,048	16,196
1935)•.....		
Totals.....	75,929	\$1,136,197

• Annual details concealed under 'Unapportioned.'

IODINE

Bibliography: U. S. Bureau of Mines I. C. 6387.

In 1935 the output of iodine in California came from one plant in Los Angeles County and showed a decrease in both quantity and value over 1934. The annual details for 1935 are concealed under 'Unapportioned' item to conceal the output of an individual operator. The 1934 production came from three plants in Los Angeles County and amounted to 355,279 pounds, valued at \$423,016.

Iodine was first produced in California during 1917 to 1921 as a by-product of potash which was reduced from kelp in an experimental station of U. S. Department of Agriculture at Summerland, but after the armistice the demand for these minerals decreased so that the plants in Santa Barbara County closed. In 1929 the General Salt Company erected a plant which reduces iodine from the waste waters of certain deep oil wells in the Long Beach field. During 1933 two more plants started operation, making a total of three producing plants in the State.

The total production of 1929, 1931 and 1933 combined, in California was 696,297 pounds of iodine worth \$1,374,311.

MAGNESIUM SALTS

Bibliography: State Mineralogist Reports XX, XXI, XXV-XXVI (inc.). Bulletin 91. 'Dictionary of Applied Chemistry,' by Thorpe. U. S. Geol. Surv., Min. Res. of P. S.

During 1935 there was an output of magnesium salts in California coming from one plant in San Diego County and two in San Mateo County, amounting to 2,785 short tons valued at \$235,531 and consisted of the carbonate and chloride. The 1935 production was an increase in both quantity and value over that of 1934, which was 2,325 tons worth \$194,642. The chloride was nearly all sold for use in magnesite stucco and cement mixtures (Sorel cement), also some for road liquor. The carbonate, a bulky white powder, was used as a heat-insulating material, as a filler for rubber, paper, paint, etc., and in medicines, in tooth paste, in face powder and as a polish for metal and glass. The sulphate marketed was utilized for medicinal and bath purposes. The material coming from San Diego County was residual bitterns from the salt plants and was in part marketed in the liquid form carrying from 35 per cent to 67 per cent $MgCl_2$ and in part as dry crystals, while that from San Mateo County was magnesium carbonate.

The average value reported for the chloride produced in California in 1934 was approximately \$46.80 per ton, f.o.b. plant.

Total Production of Magnesium Salts in California.

Commercial production of magnesium chloride in California was begun in 1916 by some of the salt companies, from the residual bitterns obtained during the evaporation of sea water for its sodium chloride. In addition, some magnesium sulphate, or 'epsom salts' is also made, annually, but in smaller amount, and magnesium carbonate by a patented process, direct from sea water.

The total production of magnesium salts in California, since the beginning of the industry here, is shown in the following tabulation:

Year	Tons	Value
1916.....	851	\$6,407
1917.....	1,064	34,973
1918.....	1,008	29,955
1919.....	1,616	82,457
1920.....	3,150	107,787
1921.....	4,153	106,140
1922.....	3,036	89,788
1923.....	3,662	116,031
1924.....	4,823	145,883
1925.....	4,221	132,553
1926.....	4,881	124,470
1927)*.....	6,241	139,589
1928)*.....		
1929)*.....	4,914	333,906
1930)*.....		
1931)*.....	2,749	217,979
1932)*.....	2,073	159,660
1933.....	2,325	194,642
1934.....	2,785	235,531
Totals.....	53,552	\$2,257,751

* Annual details concealed under 'Unapportioned.'

NITRATES

Bibliography: State Mineralogist Reports XV, XXV, XXVI, XXVII. Bulletins 24, 67, 91. U. S. G. S., Press Bulletin No. 373, July, 1918. Smithsonian Inst., Publ. No. 2421, 1916.

Nitrates of sodium, potassium and calcium have been found in various places in the desert regions of the State, but no deposit of commercial value has been developed as yet. It is hoped that a closer search may some day be rewarded by workable discoveries. At present the principal commercial source of nitrates is the Chilean saltpeter (sodium nitrate) deposits in South America.

The fixation of atmospheric nitrogen electrically has been accomplished successfully in Germany and Scandinavia. The possibilities of cheap hydroelectric power in California make the subject one of interest to us, as we have also the natural raw materials and chemicals to go with the power. Sodium and potassium cyanides can be made by fixation of atmospheric nitrogen electrically.

POTASH

Bibliography: State Mineralogist Reports XV, XVIII, XX, XXII, XXV-XXVII (inc.). Bulletins 24, 67, 91. U. S. G. S., Min. Res. 1913, 1914, 1915. Senate Doc. No. 190, 62 Congress, 2d Session. Mining & Sci. Press, Vol. 112, p. 155; Vol. 114, p. 789. Eng. & Min. Jour.-Press, Vol. 117, p. 557, Apr. 5, 1924.

The 1935 production of potash in California came from a single operator in San Bernardino County, the details of which are concealed under the 'Unapportioned' item. This was principally chloride and the product averaged 60% equivalent K_2O content. The material was sold mainly for fertilizer manufacture.

Imports of crude potash minerals and salts in the United States during 1935, according to the U. S. Bureau of Foreign and Domestic Commerce, amounted to 520,577 long tons, valued at \$10,164,029, compared with 413,897 long tons worth \$8,840,784 in 1934. These materials consisted mainly of 'manure salts,' crude chloride (muriate) and sulphate, and kainite, all of which are admitted duty free.

Quotations have recently ranged from \$33.75 per ton c.i.f. Atlantic and Gulf ports for high grade sulphate (90%-95%), \$22.50 per ton for muriate (80%), and \$14 for manure salts (30%).

Total Production of Potash in California.

Potash production began commercially in California in 1914, with a small yield from kelp. The bulk of the output comes from deposits of potash-bearing residues and brines in the old lake beds of the desert regions, particularly Searles Lake, San Bernardino County. A small amount has been made from salt-works bitterns, and for a time there was some from Portland cement dust. Some also has been obtained from molasses distillery-slops char.

The annual amounts and values of these potash materials, since their beginning in California in 1914, have been as follows:

Year	Tons	Value
1914	10	\$460
1915	1076	19,391
1916	17,808	663,605
1917	129,022	4,202,889
1918	49,381	6,808,976
1919	28,118	2,415,963
1920	26,298	1,465,463
1921	14,806	390,210
1922	17,776	584,388
1923	29,597	709,836
1924	33,107	747,407
1925	36,355	829,770
1926	32,884	812,285
1927	67,340	1,952,852
1928} *		
1929} *	178,680	5,522,350
1930} *		
1931} *	172,263	5,500,536
1932} *		
1933} *	153,147	3,932,721
1934} *		
1935} *	355,604	3,750,809
Totals	1,242,372	\$39,315,911

* Annual details concealed under 'Unapportioned.'

SALT

Bibliography: State Mineralogist Reports II, XII-XV (inc.), XVII-XXIII (inc.), XXV-XXVII. Bulletins 24, 67, 91. U. S. Geol. Survey, Bull. 669. U. S. Bur. of Mines, Bull. 146.

Most of the salt production in California is obtained by evaporation of water of the Pacific Ocean, plants being located on the shores of San Francisco, Monterey, and San Diego bays, and at Long Beach. Additional amounts are derived from lakes and lake beds in the desert regions (in part, rock salt), mainly in Imperial, Kern, and San Bernardino counties, and evaporation of alkiline lake water in Modoc County. A small amount of valuable medicinal salts has been obtained by evaporation of the water of Lake Mono, Mono County.

During the year 1935, in California there was an output of 365,711 short tons of crude salt valued at \$1,230,480, compared with 332,194 short tons worth \$1,222,810 in 1934. There were eleven plants operating in 1935 with two each in Alameda and San Bernardino counties, and one each in Imperial, Kern, Los Angeles, Modoc, Monterey, San Diego, and San Mateo counties.

The average value reported for salt produced in California during 1935 was \$3.36 per ton f.o.b. plant, as compared with \$3.68 in 1934, \$3.89 in 1933, \$3.58 in 1932, and \$3.73 in 1931.

Production of Salt in California, by Years.

Amount and value of annual production of salt in California from 1887 is shown in the following tabulation:

Year	Tons	Value	Year	Tons	Value
1887	28,000	\$112,000	1913	204,407	\$462,681
1888	30,800	92,400	1914	223,806	583,553
1889	21,000	63,000	1915	169,028	368,737
1890	8,729	57,085	1916	186,148	455,695
1891	20,094	90,303	1917	227,825	584,373
1892	23,570	104,788	1918	212,076	806,328
1893	50,500	213,000	1919	233,994	896,963
1894	49,131	140,087	1920	230,638	972,648
1895	53,031	150,576	1921	197,989	832,702
1896	64,743	153,244	1922	223,238	819,187
1897	67,851	157,520	1923	275,979	1,130,670
1898	93,421	170,855	1924	318,800	1,159,137
1899	82,654	149,588	1925	284,068	949,826
1900	89,338	204,754	1926	311,761	1,124,978
1901	126,218	366,376	1927	263,028	639,127
1902	115,208	205,876	1928	340,580	1,024,656
1903	102,895	211,365	1929	392,039	2,665,436
1904	95,968	187,300	1930	347,945	1,167,487
1905	77,118	141,925	1931	330,951	1,233,567
1906	101,650	213,228	1932	256,353	918,480
1907	88,063	310,967	1933	321,312	1,251,024
1908	121,764	281,469	1934	332,194	1,222,810
1909	155,680	414,708	1935	365,711	1,230,480
1910	174,920	395,417			
1911	173,332	324,255			
1912	185,721	383,370	Totals	8,450,269	\$27,796,001

SODA

Bibliography: State Mineralogist Reports XII, XIII, XV, XVII, XVIII, XX, XXII, XXIII, XXV-XXIX (inc.). Bulletins 24, 67, 91. U. S. Geol. Surv., Bull. 717.

The production of sodium salts in California in 1935 included: Soda ash, trona, caustic soda and bicarbonate from plants at Owens Lake, Inyo County, and soda ash, salt cake and trona ('sesqui-carbonate,' a double salt of Na_2CO_3 and NaHCO_3) from Searles Lake, and salt cake from near Twenty Nine Palms, both in San Bernardino County. There were no shipments of salt cake (sulphate) from the Carrizo Plains, San Luis Obispo County.

The output of the year 1935 amounted to 125,504 short tons valued at \$1,341,045, as compared with 99,380 short tons worth \$1,219,561 in 1934.

The dense ash and bicarbonate were used mainly in the manufacture of soap, glass, paper, oil refining, sugar refining, and chemicals; and the trona for metallurgical purposes.

Soda Production of California, by Years.

The total output, showing amount and value of these materials in California since the inception of the statistical records of the State Mining Bureau, is given in the table which follows:

Year	Tons	Value	Year	Tons	Value
1894.....	1,530	\$20,000	1916.....	10,593	\$264,825
1895.....	1,900	47,500	1917.....	24,505	928,578
1896.....	3,000	65,000	1918.....	20,447	855,423
1897.....	5,000	110,000	1919.....	21,294	721,958
1898.....	7,000	154,000	1920.....	32,407	1,164,898
1899.....	10,000	250,000	1921.....	14,828	438,996
1900.....	1,000	50,000	1922.....	20,084	573,661
1901.....	8,000	400,000	1923.....	34,885	764,284
1902.....	7,000	50,000	1924.....	32,536	711,796
1903.....	18,000	27,000	1925.....	48,625	947,649
1904.....	12,000	18,000	1926.....	63,333	1,305,802
1905.....	15,000	22,500	1927.....	62,571	1,478,239
1906.....	12,000	18,000	1928.....	80,838	1,469,297
1907.....	-----	-----	1929.....	90,646	1,838,657
1908.....	9,600	14,400	1930.....	90,122	1,627,344
1909.....	7,712	11,593	1931.....	78,701	1,217,811
1910.....	8,125	11,862	1932.....	58,017	826,369
1911.....	9,023	52,887	1933.....	70,598	1,019,130
1912.....	7,200	37,094	1934.....	99,380	1,219,561
1913.....	1,861	24,936	1935.....	125,504	1,341,045
1914.....	6,522	115,396			
1915.....	5,799	83,485	Totals.....	1,337,186	\$22,298,976

- ▲ DEPOSITS PRODUCING PRESENT OR RECENT
- X KNOWN DEPOSITS OF IMPORTANCE.
- O DEPOSITS OF LITTLE COMMERCIAL IMPORT

FUELS

- COAL
- NATURAL GAS
- PETROLEUM

METALS

- ANTIMONY
- ARSENIC
- BERYLLIUM
- BISMUTH
- CADMIUM
- COBALT
- COPPER
- GOLD
- IRON ORE
- LEAD
- MANGANESE ORE
- MOLYBDENUM
- NICKEL
- PLATINUM
- QUICK SILVER
- SILVER
- TIN
- TITANIUM
- TUNGSTEN
- VANADIUM
- ZINC

STRUCTURAL MATERIALS

- BITUMINOUS ROCK
- BRICK & HOLLOW BUILD
- CEMENT
- CHROMITE
- GRANITE
- LIME
- MAGNESITE
- MARBLE
- ONYX & TRAVERTINE
- SANDSTONE
- SERPENTINE
- SLATE
- STONE, MISCELLANEOUS (CRUSHED ROCK, SAND)

INDUSTRIAL MATERIALS

- ASBESTOS
- BARYTES
- BENTONITE (FULLER'S E
- CARBON DIOXIDE
- CLAY
- DIATOMITE (DIATOMACEO
- DOLOMITE
- FELDSPAR
- FLUORSPAR
- GEMS
- GRAPHITE
- GYP SUM
- LIMESTONE
- LITHIA
- MICA
- MINERAL PAINT
- MINERAL WATER
- PHOSPHATES
- PUMICE (LUMP) (VOLCANIC ASH)
- PYRITE
- SHALE OIL
- SILICA (QUARTZ) (GLASS SAND)
- SILIMANITE-ANDALUSITE-C
- SOAPSTONE TALC
- STRONTIUM
- SULPHUR
- WOLLASTONITE

SALINES

- BORATES
- BROMINE
- CALCIUM CHLORIDE
- IODINE
- MAGNESIUM SALTS
- POTASH
- SALT
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CALIFORNIA MINERALS

☒ DEPOSITS PRODUCING - AT
PRESENT OR RECENT YEARS
☒ KNOWN DEPOSITS OF COMMERCIAL
IMPORTANCE
☐ DEPOSITS OF LITTLE OR UNKNOWN
COMMERCIAL IMPORTANCE

FUELS

COAL
NATURAL GAS
PETROLEUM

METALS

STRUCTURAL MATERIALS

BITUMINOUS POCK
BRICK & HOLLOW BUILDING TILE
CEMENT
CHROME
GRANITE
LIME
NAUDESITE
MARBLE
ONYX & TRAVERTINE
SANDSTONE
SERPENTINE
SLATE
STONE MISCELLANEOUS
(CRUSHED ROCK, SAND, GRAVEL)

INDUSTRIAL MATERIALS

[illegible]

SALINES

[illegible]

CHAPTER SEVEN

BY COUNTIES

Introductory.

The State of California includes a total area of 158,297 square miles, of which 155,652 square miles are of land. The maximum width is 235 miles, the minimum 148 miles, and the length from the north-west corner to the southeast corner is 775 miles. The State is divided into fifty-eight counties. The 1930 census figures show a total population for California of 5,672,009. Minerals of commercial value exist in every county, and during 1934 some active production was reported to the State Division of Mines from all of the fifty-eight.

Rank of Counties in Mineral Yield, 1935.

Of the ten leading counties in point of total value of mineral output for 1935, the first six, viz., Los Angeles, Kern, Fresno, Orange, Ventura and Kings, also the ninth which is Santa Barbara, owe their position to petroleum and natural gas. Los Angeles County, due to crude oil, led all other counties in 1935, and is credited with 27% of the State's total mineral value, holding this position since 1923 when it passed Kern, which had led the State for many years. San Bernardino (seventh) owes its position to cement, borates, and potash; Nevada (eighth) and Sacramento (tenth) owe their positions to gold.

There were twenty-four counties having a mineral production in excess of a million dollars during 1935 in seven of which petroleum was an important item; in eight, gold; in six, natural gas; in five, cement; in two, borates; and in one each, miscellaneous stone and potash. In point of variety and diversity San Bernardino County led all others in 1935 with a total of twenty-two different mineral products on the commercial list, followed by Los Angeles with nineteen, San Diego with eighteen, Inyo with seventeen; Fresno, Kern, and Riverside each with fifteen; Orange with fourteen; Monterey and San Luis Obispo each with thirteen; El Dorado, Placer, and Sacramento each with twelve; Alameda, Butte and Ventura each with eleven; and Calaveras, Contra Costa, Imperial, Santa Clara, and Tuolumne each with ten.

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<i>County</i>	<i>Value</i>
1. Los Angeles -----	\$72,148,990
2. Kern -----	46,994,409
3. Fresno -----	30,016,686
4. Orange -----	24,360,634
5. Ventura -----	14,236,946
6. Kings -----	10,580,002
7. San Bernardino -----	9,886,453
8. Nevada -----	9,195,148
9. Santa Barbara -----	8,680,173
10. Sacramento -----	4,336,763
11. Amador -----	2,765,299
12. El Dorado -----	2,388,999
13. Calaveras -----	2,312,953
14. Riverside -----	2,226,623
15. Alameda -----	2,010,493
16. Yuba -----	1,841,221
17. Merced -----	1,704,775
18. San Mateo -----	1,590,159
19. Inyo -----	1,559,806
20. Santa Cruz -----	1,533,433
21. Contra Costa -----	1,361,616
22. Shasta -----	1,350,262
23. Placer -----	1,026,451
24. Butte -----	1,009,952
25. Mariposa -----	873,242
26. Sierra -----	860,716
27. Trinity -----	745,186
28. Siskiyou -----	705,737
29. Stanislaus -----	585,656
30. Tuolumne -----	474,610
31. San Diego -----	471,387
32. San Joaquin -----	416,270
33. Plumas -----	414,516
34. Lake -----	320,750
35. Santa Clara -----	312,676
36. Madera -----	306,644
37. San Luis Obispo -----	265,443
38. San Benito -----	242,254
39. Mono -----	223,748
40. Napa -----	198,156
41. Sonoma -----	170,800
42. Monterey -----	132,689
43. Imperial -----	124,135
44. Marin -----	113,914
45. Humboldt -----	85,065
46. Tulare -----	53,911
47. Modoc -----	52,432
48. Del Norte -----	46,589
49. Glenn -----	41,287
50. Yolo -----	34,665
51. Lassen -----	21,732
52. Tehama -----	11,391
53. Mendocino -----	10,429
54. Alpine -----	9,441
55. Solano -----	7,450
56. Colusa -----	1,901
57. San Francisco -----	892
58. Sutter -----	357
Total -----	\$263,404,317

ALAMEDA

Land area: 732 square miles.

Population: 475,153 (1930 census).

Location: East side of San Francisco Bay.

County seat: Oakland.

References: State Mineralogist Report XVII: XVIII: XX: XXVI (Oct. 1929).

Alameda County, while in no sense one of the 'mining counties,' came fifteenth on the list of counties as to value, with a mineral production for 1935 worth \$2,010,493, and had eleven different substances. This was a decrease from the 1934 output which was valued at \$2,379,633.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Value</i>
Brick and hollow building tile-----	\$218,988
Clay, pottery-----	3,282
Copper-----	2,250
Stone, miscellaneous-----	681,555
Other minerals *-----	1,104,418
Total value-----	\$2,010,493

* Includes bromine, lime, limestone, salt.

ALPINE

Land area: 776 square miles.

Population: 236 (1930 census).

Location: On eastern border of State, south of Lake Tahoe.

County seat: Markleeville.

References: State Mineralogist Report XV: XVII: XVIII: XXVII (Oct., 1931).

Alpine County ranked fifty-fourth in value of output for 1935, which was \$9,441, compared with \$25,431 in 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$280
Silver-----	226 fine ozs.	162
Stone, miscellaneous-----	-----	8,989
Other minerals *-----	-----	10
Total value-----	-----	\$9,441

* Includes copper and lead.

AMADOR

Land area: 601 square miles.

Population: 8494 (1930 census).

Location: East-central part of State—Mother Lode District.

County seat: Jackson.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XX: XXIII: (April, 1927): XXX.

Amador County ranked eleventh as to value of mineral output for 1935, with nine different substances worth \$2,765,299, compared with \$2,400,161 in 1934.

Amador at one time led the State in gold production, though exceeded in 1920-1923 and in 1926-1927 by Yuba and Nevada counties, but in 1925 and 1928 by Yuba only, in 1929-1930 by Nevada only, and in 1931-1934 by Nevada and Sacramento.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay (pottery)-----	37,876 tons	\$66,654
Copper-----	9,641 lbs.	800
Gold-----	-----	2,614,235
Lead-----	3,271 lbs.	131
Silver-----	24,534 fine ozs.	17,634
Stone, miscellaneous-----	-----	17,066
Unapportioned *-----	-----	48,779
Total-----	-----	\$2,765,299

* Includes brick and coal.

BUTTE

Land area: 1722 square miles.

Population: 34,010 (1930 census).

Location: North-central portion of State.

County seat: Oroville.

References: State Mineralogist Report XV : XVII : XVIII : XXIV : XXVI (Oct., 1930) : XXXI (Jan., 1936).

Butte County ranked twenty-fourth in California in regard to value of mineral output in 1935, with eleven different substances, having a total value of \$1,009,952, as compared with \$637,962 in 1934.

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$952,632
Silver-----	5,923 fine ozs.	4,257
Stone, miscellaneous-----	-----	49,653
Copper-----	2,001 lbs.	166
Unapportioned *-----	-----	3,244
Total -----	-----	\$1,009,952

* Includes brick, gems (diamonds), lead, mineral water, natural gas, soapstone.

CALAVERAS

Land area: 1027 square miles.

Population: 6009 (1930 census).

Location: East-central portion of State—Mother Lode District.

County seat: San Andreas.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXI : XXXII (July, 1936).

Calaveras County ranked thirteenth in California in regard to value of mineral output in 1935 with a total of \$2,312,953, as compared with \$2,196,592 in 1934. The increase was due to gold. Commercial production for 1935 consisting of nine different substances, was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$1,607,242
Silver-----	11,434 fine ozs.	8,218
Stone, miscellaneous-----	-----	56,519
Unapportioned*-----	-----	640,974
Total-----	-----	\$2,312,953

* Includes cement, clay, copper, lead, mineral water.

COLUSA

Land area: 1140 square miles.

Population: 10,257 (1930 census).

Location: Sacramento Valley.

County seat: Colusa.

References: State Mineralogist Report XIV : XVII : XVIII : XXV : (April, 1929).

Colusa County ranked fifty-sixth in regard to the value of mineral output in 1935 with six different mineral substances worth a total of \$1,901 as compared with \$45,875 in 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$938
Silver-----	9 fine ozs.	6
Unapportioned *-----	-----	957
Total-----	-----	\$1,901

* Includes petroleum, quicksilver, stone (miscellaneous).

CONTRA COSTA

Land area: 714 square miles.

Population: 78,554 (1930 census).

Location: East side of San Francisco Bay.

County seat: Martinez.

References: State Mineralogist Report XVII : XVIII : XXIII (Jan., 1927).

Contra Costa County stands twenty-first on the list in respect to value of mineral output for 1935, with ten different substances worth \$1,361,616, as compared with \$1,734,999 in 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Value</i>
Brick and hollow building tile-----	\$368,028
Stone, miscellaneous-----	274,237
Unapportioned *-----	719,351
Total-----	\$1,361,616

* Includes cement, clay (pottery), copper, lead, mineral water, silica (glass sand).

DEL NORTE

Land area: 1024 square miles.

Population: 4734 (1930 census).

Location: Extreme northwest corner of State.

References: State Mineralogist Report XIV:XVII:XXI (July, 1925) : XXIX Jan.-April, 1933).

Del Norte County was in forty-eighth place as to mineral production for 1935, with four different substances worth \$46,589, as compared with \$81,998 in 1934.

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$4,798
Silver-----	5 fine ozs.	3
Stone, miscellaneous-----	-----	41,788
Total-----	-----	\$46,589

EL DORADO

Land area: 1753 square miles.

Population: 8303 (1930 census).

Location: East-central portion of the State, northernmost of the Mother Lode counties.

County seat: Placerville.

References: State Mineralogist Report XV : XVII : XVIII : XIX : XX : XXII (Oct., 1926) : XXXI.

El Dorado County, which contains the location where gold in California was first heralded to the world, comes twelfth on the list

of counties ranked according to value for 1935, with twelve different mineral substances worth \$2,388,999. In addition to the segregated figures here given, a large tonnage of limestone is annually shipped for use in cement manufacture, the value being included in the State's total for cement. The 1934 output was valued at \$1,738,576. Gold accounts for the increased value.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	12,391 lbs.	\$1,028
Gold-----	-----	1,803,368
Limestone-----	151,814 tons	298,867
Silver-----	8,268 fine ozs.	5,943
Stone, miscellaneous-----	-----	46,886
Unapportioned *-----	-----	232,907
Total-----	-----	\$2,388,999

* Includes lead, lime, mineral water, silica (quartz), slate, soapstone.

FRESNO

Land area: 5950 square miles.

Population: 144,369 (1930 census).

Location: South-central portion of State.

County seat: Fresno.

References: State Mineralogist Report XIV : XVII : XVIII : XXV (July, 1929).

Fresno County, third in importance as a mineral producer among the counties of California, reports an output for 1935 of fifteen different mineral substances, with a total value of \$30,016,686, as compared with the 1934 value of \$7,772,807.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$20,645
Gypsum-----	6,633 tons	19,899
Natural gas-----	63,579,904 M cu. ft.	3,687,049
Petroleum-----	27,679,545 bbls.	26,047,611
Silver-----	166 fine ozs.	119
Stone, miscellaneous-----	-----	161,760
Unapportioned *-----	-----	79,603
Total-----	-----	\$30,016,686

* Includes brick and hollow building tile, chromite, copper, diatomite, granite, limestone, quicksilver.

GLENN

Land area: 1259 square miles.

Population: 10,935 (1930 census).

Location: West side of Sacramento Valley.

County seat: Willows.

References: State Mineralogist Report XIV : XVII : XVIII.

Glenn County stands forty-ninth as a mineral producing county of the State for 1935 and owes its position mainly to the presence of large deposits of sand and gravel, much of which is used as railroad ballast.

Commercial production for 1935 was as follows, being an increase of \$30,608, the output for the previous year:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous-----	\$41,285
Gold-----	2
Total-----	\$41,287

HUMBOLDT

Land area: 3634 square miles.

Population: 43,189 (1930 census).

Location: Northwestern portion of State, bordering on Pacific Ocean.

County seat: Eureka.

References: State Mineralogist Report XIV : XVII : XVIII : XXI (July, 1925).

Humboldt County ranked forty-fifth in the value of its mineral output among the counties of the State for 1935, with seven different mineral substances valued at \$85,065, compared with the 1934 output worth \$81,432.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$31,677
Silver-----	98 fine ozs.	70
Stone, miscellaneous-----	-----	50,707
Unapportioned *-----	-----	2,611
Total-----		<hr/> \$85,065

* Includes brick, clay, natural gas.

IMPERIAL

Land area: 4089 square miles.

Population: 60,894 (1930 census).

Location: Extreme southeast corner of the State.

County seat: El Centro.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXII (April, 1926).

Imperial County ranked forty-third in total value of mineral output for 1935, with ten different mineral substances, worth \$124,135, compared with \$108,480 for 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$59,406
Silver-----	4,147 fine ozs.	2,981
Stone, miscellaneous-----	-----	20,695
Unapportioned *-----	-----	41,053
Total-----		<hr/> \$124,135

* Includes carbon dioxide, gypsum, mica, pumice, salt, cyanite.

INYO

Land area: 10,019 square miles.

Population: 6557 (1930 census).

Location: Lies on eastern border of State, north of San Bernardino County.

County seat: Independence.

References: State Mineralogist Report XV : XVII : XVIII : XX : XXII (Oct., 1926) : XXVII : XXX.

Inyo County's mineral output for 1935 reached a total value of \$1,559,806, having seventeen different mineral substances and standing nineteenth among the counties of the State as to value of production. The 1934 yield was worth \$1,293,725.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	42,589 lbs.	\$3,535
Gold-----	-----	656,339
Lead-----	578,583 lbs.	23,143
Pumice and volcanic ash-----	954 tons	10,034
Silver-----	38,429 fine ozs.	27,621
Zinc-----	274,725 lbs.	12,088
Unapportioned *-----	-----	827,046
Total-----	-----	\$1,559,806

* Includes bentonite, borates, dolomite, quicksilver, slate, talc, soda, sulphur, stone (miscellaneous).

KERN

Land area: 8003 square miles.

Population: 82,219 (1930 census).

Location: South-central portion of State.

County seat: Bakersfield.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXV (Jan., 1929) : XXIX (July-Oct., 1933) : XXX.

Kern County, because of its immensely productive oil fields, for many years stood preeminent among all counties of California in the value of its mineral output. It was surpassed by Los Angeles and Orange counties in 1923, but by Los Angeles only in 1924-1935, for which petroleum is responsible. The 1935 production consisted of fifteen different mineral substances valued at \$46,944,409, compared with the 1934 output worth \$37,053,187.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	37,971 lbs.	\$3,152
Gold-----	-----	1,391,646
Lead-----	2,180 tons	87
Natural gas-----	36,089,134 M cu. ft.	1,891,675
Petroleum-----	54,723,481 bbls.	39,905,553
Silver-----	147,447 fine ozs.	105,978
Stone, miscellaneous-----	-----	124,360
Unapportioned *-----	-----	352,198
Total-----	-----	\$46,944,409

* Includes borates, brick, cement, clay (oil-well drilling mud), volcanic ash, salt, tungsten.

KINGS

Land area: 1559 square miles.

Population: 25,277 (1930 census).

Location: South-central portion of the State.

County seat: Hanford.

References: State Mineralogist Report XIV : XVII : XVIII : XXVI Oct., 1930).

Kings County, previous to the discovery of Kettleman Hills oil fields in 1928, had little or no mineral output, but in 1929 it ranked ninth in total value of annual mineral production, seventh in 1930, third from 1931 to 1934, and sixth in 1935.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Natural gas.....	65,372,401 M cu. ft.	\$3,088,477
Petroleum.....	7,167,687 bbls.	7,490,233
Gold.....	-----	83
Unapportioned *.....	-----	1,209
Total.....	-----	\$10,580,002

* Includes quicksilver and stone (miscellaneous).

LAKE

Land area: 1278 square miles.

Population: 7166 (1930 census).

Location: About fifty miles north of San Francisco Bay and the same distance inland from the Pacific Ocean.

County seat: Lakeport.

References: State Mineralogist Report XIV : XVII : XVIII : XX : XXV (July, 1929).

Lake County was in thirty-fourth place as to the value of mineral output for 1935, with six different mineral substances, worth \$320,750, compared with \$260,481 for 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Mineral water.....	22,410 gal.	\$13,909
Quicksilver.....	4,097 flasks	285,426
Stone, miscellaneous.....	-----	21,315
Gold.....	-----	65
Unapportioned.....	-----	35
Total.....	-----	\$320,750

LASSEN

Land area: 4531 square miles.

Population: 12,587 (1930 census).

Location: Northeast portion of State.

County seat: Susanville.

References: State Mineralogist Report XV : XVII : XVIII : XIX : XXV (Jan., 1929) : XXX : XXXII (Oct., 1936).

Lassen County was in fifty-first place as a mineral producer for 1935, with output as follows, being a decrease from \$28,318 which was the value for the previous year:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold.....	-----	\$12,182
Silver.....	396 fine ozs.	285
Stone, miscellaneous.....	-----	8,728
Unapportioned.....	-----	537
Total.....	-----	\$21,732

LOS ANGELES

Land area: 4067 square miles.

Population: 2,201,526 (1930 census).

Location: One of the southwestern coast counties.

County seat: Los Angeles.

References: State Mineralogist Report XV : XVII : XVIII : XIX : XX : XXIII (July, 1927) : XXX.

The mineral production for Los Angeles County for the year 1935 amounted in value to \$72,148,990 as compared with 1934 output worth

\$66,359,227. This accounted for 27% of the entire State's total for 1935 and ranked Los Angeles first in the State as a mineral producer, exceeding Kern County, which was the leader for several years in the past.

Commercial production for 1935, consisting of 19 substances, was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Brick-----	38,522 M	\$850,415
Hollow building tile-----	1,164 tons	11,193
Clay, pottery-----	18,118 tons	11,829
Copper-----	3,885 lbs.	322
Gold-----	-----	219,405
Mineral water-----	7,379,521 gals.	647,416
Natural gas-----	66,416,318 M cu. ft.	4,448,950
Petroleum-----	70,378,196 bbls.	64,339,261
Sandstone-----	-----	4,578
Silver-----	5,755 fine ozs.	4,135
Stone, miscellaneous-----	-----	1,135,068
Unapportioned *-----	-----	476,418
Total-----	-----	\$72,148,990

* Includes cement (see San Bernardino County), diatomite, graphite, iodine, lead, salt.

MADERA

Land area: 2112 square miles.

Population: 17,152 (1930 census).

Location: East-central portion of State.

County seat: Madera.

References: State Mineralogist Report XIV : XVII : XVIII : XXIV (Oct., 1928) : XXX : XXXI.

Madera County was in thirty-sixth place as a mineral producer, for 1935, with an output of six different substances valued at \$306,644, compared with \$264,142 for 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$21,410
Silver-----	116 fine ozs.	83
Stone, miscellaneous-----	-----	54,871
Unapportioned *-----	-----	230,280
Total-----	-----	\$306,644

* Includes granite, lead, volcanic ash.

MARIN

Land area: 529 square miles.

Population: 41,635 (1930 census).

Location: Adjoins San Francisco on the north.

County seat: San Rafael.

References: State Mineralogist Report XIV : XVII : XVIII : XXII (July, 1926) : XXIX.

Marin County, in forty-fourth place as to the value of mineral output for 1935, with five different mineral substances, had a commercial production as follows:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous-----	\$98,663
Unapportioned *-----	15,251
Total-----	\$113,914

* Includes brick, gems (jasper), mineral water.

MARIPOSA

Land area: 1453 square miles.

Population: 2530 (1930 census).

Location: Most southerly of the Mother Lode counties. East central portion of State.

County seat: Mariposa.

References: State Mineralogist Report XIV : XVII : XVIII : XXIV (April, 1928) : XXXI (Jan., 1935).

Mariposa County is one of the distinctly 'mining' counties of the State, although it stands but twenty-fifth on the list of counties in regard to the value of its mineral output for 1935 with a total of \$873,242, as compared with \$807,908 for 1934. Mariposa County is also the source of a large tonnage of limestone annually, which is otherwise credited to cement manufacture in Merced County.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	2,252 lbs.	\$187
Gold-----	-----	514,544
Lead-----	1,438 lbs.	57
Silver-----	6,835 fine ozs.	4,913
Stone, miscellaneous-----	-----	178,266
Unapportioned *-----	-----	175,275
Total-----	-----	<u>\$873,242</u>

* Includes barite and granite.

MENDOCINO

Land area: 3453 square miles.

Population: 23,491 (1930 census).

Location: Joins Humboldt County on the south and bounded by the Pacific Ocean on the west.

County seat: Ukiah.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX.

Mendocino County's mineral output for 1935 was valued at \$10,429 which ranked it fifty-third among the counties of the State as a mineral producer, compared with \$14,351 for 1934. Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous-----	\$10,389
Unapportioned-----	40
Total-----	<u>\$10,429</u>

MERCED

Land area: 1995 square miles.

Population: 36,900 (1930 census).

Location: About the geographical center of the State.

County seat: Merced.

References: State Mineralogist Report XIV : XVII : XVIII : XXI (April, 1925) : XXXI (Jan. 1935).

Merced County ranks seventeenth as to the value of mineral output for 1935, with five different substances worth \$1,704,775 compared with \$1,050,492 for 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$1,302,369
Silver-----	3,841 fine ozs.	2,761
Stone, miscellaneous-----	-----	14,750
Unapportioned-----	-----	384,895
Total-----	-----	\$1,704,775

MODOC

Land area: 3823 square miles.

Population: 8038 (1930 census).

Location: The extreme northeast corner of the State.

County seat: Alturas.

References: State Mineralogist Report XV : XVII : XVIII :
XXV (Jan., 1929) : XXX : XXXII (Oct., 1936).

Modoc County, in forty-seventh place, with six different mineral substances, reported a commercial production as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$84
Silver-----	11 fine ozs.	8
Stone, miscellaneous-----	-----	51,550
Unapportioned-----	-----	790
Total-----	-----	\$52,432

MONO

Land area: 3030 square miles.

Population: 1359 (1930 census).

Location: Is bordered by the State of Nevada on the east and is about in the central portion of the State measured on a north and south line.

County seat: Bridgeport.

References: State Mineralogist Report XV : XVII : XVIII :
XX : XXIII (Oct., 1927) : XXX.

Mono County, in thirty-ninth place with eight different mineral substances, reported a commercial production for 1935 as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$39,994
Lead-----	6,305 lbs.	252
Silver-----	101,066 fine ozs.	72,634
Stone, miscellaneous-----	-----	38,032
Copper-----	1,295 lbs.	107
Unapportioned-----	-----	72,729
Total-----	-----	\$223,748

MONTEREY

Land area: 3330 square miles.

Population: 53,668 (1930 census).

Location: West-central portion of State, bordering on Pacific Ocean.

County seat: Salinas.

References: State Mineralogist Report XV : XVII : XVIII :
XIX : XXI (Jan., 1925) : XXXI.

Monterey County produced thirteen different mineral substances during 1935, having a total value of \$132,689, as compared with \$190,902 for 1934.

In forty-second place, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$297
Sandstone-----	-----	4,370
Silver-----	1 fine oz.	1
Stone, miscellaneous-----	-----	61,261
Unapportioned *-----	-----	66,760
Total-----	-----	\$132,689

* Includes coal, diatomite, dolomite, gems (jasper), natural gas, petroleum, quicksilver, salt.

NAPA

Land area: 783 square miles.

Population: 22,832 (1930 census).

Location: Directly north of San Francisco Bay—one of the 'bay counties.'

County seat: Napa.

References: State Mineralogist Report XIV : XVII : XVIII : XX : XXV (April, 1929).

In 1935 the value of Napa County's mineral output was \$198,156, placing it in fortieth place in the list of counties, as compared with \$398,214 for 1934.

With nine different mineral substances, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$3,984
Mineral water-----	38,000 gals.	3,650
Quicksilver-----	1,109 flasks	60,649
Silver-----	11,785 fine ozs.	8,470
Unapportioned *-----	-----	121,403
Total-----	-----	\$198,156

* Includes chromite, copper, pumice, stone (miscellaneous).

NEVADA

Land area: 974 square miles.

Population: 10,589 (1930 census).

Location: North of Lake Tahoe on the eastern border of the State.

County seat: Nevada City.

References: State Mineralogist Report XVI : XVII : XVIII : XIX : XX : XXVI (April, 1930) : XXXI : XXXII.

Nevada County, one of the mountain counties of California, for some years alternated with Amador in the gold lead, but both were passed by Yuba in 1918-1921, also 1923. In 1922, 1924, 1929 to 1935, Nevada led all counties in gold output, but it held third place in 1925 and 1928, and second place in 1926 and 1927. Nevada County stands eighth on the list of counties in regard to value of its mineral output for 1935, with seven different mineral substances worth \$9,195,148, as compared with \$7,488,996 for 1934. The increase was due mainly to gold and silver.

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	201,890 lbs.	\$16,757
Gold-----	-----	8,785,099
Lead-----	355,526 lbs.	14,221
Silver-----	520,362 fine ozs.	374,010
Stone, miscellaneous-----	-----	2,661
Unapportioned-----	-----	2,400
Total-----	-----	\$9,195,148

ORANGE

Land area: 795 square miles.

Population: 118,611 (1930 census).

Location: Southwest portion of the State, bordering Pacific Ocean.

County seat: Santa Ana.

References: State Mineralogist Report XV : XVII : XVIII : XIX : XX : XXI (Jan., 1925) : XXXI.

Orange County, in fourth place as to value of mineral output for 1934, produced fourteen mineral substances, worth \$24,360,634, as compared with \$25,746,031 for 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay, pottery-----	19,276 tons	\$60,021
Gold-----	-----	1,154
Lead-----	39,981 lbs.	1,599
Natural gas-----	25,810,647 M cu. ft.	1,802,397
Petroleum-----	24,971,601 bbls.	22,422,526
Silver-----	15,461 fine ozs.	11,113
Stone, miscellaneous-----	-----	45,311
Zinc-----	-----	2,344
Unapportioned *-----	-----	14,169
Total-----	-----	\$24,360,634

* Includes brick, copper, mineral water, silica (glass sand), zinc.

PLACER

Land area: 1395 square miles.

Population: 24,442 (1930 census).

Location: Eastern border of State directly west of Lake Tahoe.

County seat: Auburn.

References: State Mineralogist Report XV : XVII : XVIII : XIX : XX : XXIII (July, 1927) : XXXI : XXXII (Jan., 1936).

Placer County in twenty-third place, with twelve different mineral substances had a commercial production for 1935 as follows, compared with \$678,232 for the previous year:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay, pottery-----	49,508 tons	\$76,141
Gold-----	-----	925,309
Silver-----	18,941 fine ozs.	13,614
Stone, miscellaneous-----	-----	3,631
Copper-----	3,178 lbs.	263
Unapportioned *-----	-----	7,493
Total-----	-----	\$1,026,451

* Includes brick, chromite, granite, lead, mineral paint, silica (quartz).

PLUMAS

Land area: 2594 square miles.

Population: 7909 (1930 census).

Location: Northeastern border of State, south of Lassen County.

County seat: Quincy.

References: State Mineralogist Report XVI : XVII : XVIII : XIX : XX : XXIV (Oct., 1928) : XXIX : XXX.

Plumas County's mineral output for 1935 with eight different mineral substances was valued at \$414,516 as compared with \$181,143 for 1934.

In thirty-third place, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	1,654,113 lbs.	\$137,291
Gold-----	-----	207,856
Lead-----	1,331 lbs.	53
Silver-----	47,864 fine ozs.	34,402
Stone, miscellaneous-----	-----	15,054
Unapportioned*-----	-----	19,860
Total-----	-----	\$414,516

* Includes barite and granite.

RIVERSIDE

Land area: 7240 square miles.

Population: 82,078 (1930 census).

Location: Southern portion of State.

County seat: Riverside.

References: State Mineralogist Report XV : XVII : XVIII : XX : XXV (Oct., 1929) : XXX : XXXI.

Riverside is the fourth county in the State in size and the fourteenth in regard to the total value of mineral output for 1935. Within its borders are included mountain, desert, and agricultural land. In point of variety Riverside County showed fifteen different mineral substances commercially produced in 1935 with a total value of \$2,226,623, compared with the 1934 output which was valued at \$2,590,545.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay, pottery-----	54,356 tons	\$73,809
Gold-----	-----	112,057
Lead-----	15,393 lbs.	616
Silver-----	2,717 fine ozs.	1,953
Stone, miscellaneous-----	-----	166,623
Copper-----	2,073 lbs.	172
Unapportioned*-----	-----	1,871,393
Total-----	-----	\$2,226,623

* Includes brick and hollow building tile, cement, gems (Iceland spar), gypsum, manganese ore, mineral water, silica (glass sand).

SACRAMENTO

Land area: 983 square miles.

Population: 141,915 (1930 census).

Location: North-central portion of State.

County seat: Sacramento.

References: State Mineralogist Report XV : XVII : XVIII : XX : XXI (Jan., 1925) : XXXI.

Sacramento stands tenth among the counties of the State as a mineral producer, the output, principally gold, for 1935 being valued at \$4,332,628 as compared with the 1934 production worth \$3,877,757. In regard to gold output alone, this county ranks second, being exceeded only by Nevada, the Sacramento product coming from the dredges. With eleven mineral substances, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Brick and hollow building tile-----	-----	\$77,562
Gold-----	-----	3,983,985
Silver-----	4,400 fine ozs.	3,163
Stone, miscellaneous-----	-----	242,837
Unapportioned-----	-----	29,216
Total-----	-----	<hr/> \$4,332,628

SAN BENITO

Land area: 1392 square miles.

Population: 11,310 (1930 census).

Location: West-central portion of State.

County seat: Hollister.

References: State Mineralogist Report XV : XVII : XVIII : XX : XXII (April, 1926).

San Benito County ranked thirty-eighth among the counties in regard to the value of total mineral production for 1935, having an output worth \$242,254 as compared with \$266,857 for the previous year.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Quicksilver-----	791 flasks	\$55,015
Unapportioned*-----	-----	187,239
Total-----	-----	<hr/> \$242,254

* Includes bentonite and stone miscellaneous.

SAN BERNARDINO

Land area: 20,157 square miles.

Population: 133,827 (1930 census).

Location: Southeastern portion of State.

County seat: San Bernardino.

References: State Mineralogist Report XV : XVII : XVIII : XIX : XXVI (July, 1930) : XXVII (July, 1931) : XXX.

San Bernardino, by far the largest county in the State in area, ranked seventh in regard to the value of mineral output for 1935 with a total of \$9,886,453 as compared with the 1934 total of \$10,537,050.

San Bernardino, for several years (except 1918), has led all other counties in the State in point of variety of minerals, producing commercially during 1935 a total of twenty-two different substances.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Bentonite-----	4,028 tons	\$37,695
Clay (pottery)-----	2,623 tons	23,690
Copper-----	19,553 lbs.	1,623
Gold-----	-----	279,020
Lead-----	123,776 lbs.	4,951
Silver-----	159,633 fine ozs.	114,736
Stone, miscellaneous-----	-----	199,292
Unapportioned*-----	-----	9,225,446
Total-----	-----	\$9,886,453

* Includes tungsten, borates, brick, calcium chloride, cement, iron, lime, limestone, onyx, mineral water, potash, salt, talc, soda.

SAN DIEGO

Land area: 4221 square miles.

Population: 209,477 (1930 census).

Location: Extreme southwest corner of State.

County seat: San Diego.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXI (July, 1925), XXX.

San Diego County ranks thirty-first in the total value of its mineral output for the year 1935 with eighteen different mineral substances on the commercial list. The value for 1935 was \$471,387, as compared with the 1934 output worth \$487,266.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$10,367
Granite-----	6,189 cu. ft.	10,614
Lead-----	8,323 lbs.	333
Silver-----	90 fine ozs.	65
Stone miscellaneous-----	-----	198,070
Unapportioned*-----	-----	251,938
Total-----	-----	\$471,387

* Includes bentonite, brick and hollow building tile, bromine, clay (pottery), copper, feldspar, gems (kunzite and tourmaline), magnesium salt, mineral water, salt, silica (quartz), tube-mill pebbles.

SAN FRANCISCO

Land area: 46½ square miles.

Population: 637,212 (1930 census).

County seat: San Francisco.

References: State Mineralogist Report XVII : XVIII : XX : XXV (April, 1929).

Surprising as it may appear at first glance, San Francisco County is listed among the mineral producing sections of the State, actual production consisting mainly of crushed rock, sand, gravel, and mineral water.

In fifty-seventh place, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Value</i>
Unapportioned * -----	\$892

* Includes mineral water and miscellaneous stone.

SAN JOAQUIN

Land area: 1448 square miles.

Population: 102,871 (1930 census).

Location: Central portion of State.

County seat: Stockton.

References: State Mineralogist Report XIV : XVII : XVIII : XXI (April, 1925).

San Joaquin County reported a mineral production for 1935 having a total value of \$416,270 as compared with \$148,097 for 1934. In thirty-second place, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$99,698
Silver-----	151 fine ozs.	109
Stone, miscellaneous-----	-----	93,053
Unapportioned*-----	-----	223,408
Total-----	-----	\$416,270

*Includes brick and hollow building tile, and natural gas.

SAN LUIS OBISPO

Land area: 3334 square miles.

Population: 29,617 (1930).

Location: Bordered by Kern County on the east and the Pacific Ocean on the west.

County seat: San Luis Obispo.

References: State Mineralogist Report XV : XVII : XVIII : XXI (Oct., 1925) : XXXI (Oct., 1935).

The total value of the mineral production of San Luis Obispo County in 1935, with thirteen different mineral substances, was \$265,443 as compared with \$138,453 in 1934. In thirty-seventh place, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$287
Quicksilver-----	2,474 flasks	167,613
Stone, miscellaneous-----	-----	22,236
Unapportioned*-----	-----	75,307
Total-----	-----	\$265,443

* Includes brick and hollow building tile, chromite, clay (oil-well drilling mud and pottery), limestone, mineral water, petroleum, volcanic ash, sandstone.

SAN MATEO

Land area: 447 square miles.

Population: 77,338 (1930 census).

Location: Peninsula, adjoined by San Francisco on the north.

County seat: Redwood City.

References: State Mineralogist Report XVII : XVIII : XXV (April, 1929) : XXIX.

San Mateo had a mineral output in 1935 of seven different substances having a total value of \$1,590,159, as compared with the 1934 production worth \$1,562,490.

In eighteenth place, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous -----	\$98,488
Unapportioned* -----	1,491,671
Total -----	\$1,590,159

* Includes cement, limestone, magnesium salts, salt.

SANTA BARBARA

Land area: 2740 square miles.

Population: 65,075 (1930 census).

Location: Southwestern portion of State, adjoining San Luis Obispo on the south.

County seat: Santa Barbara.

References: State Mineralogist Report XV : XVII : XVIII : XIX : XXI (Oct., 1925) : XXXII.

Santa Barbara County owes its position of ninth place in the State in regard to its mineral output to the presence of productive oil fields within its boundaries. The total value of its mineral production during the year 1935 was \$8,680,173 as compared with the 1934 output of \$7,570,191.

With nine different substances, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Natural gas-----	4,596,531 M cu. ft.	\$524,998
Petroleum-----	7,649,068 bbls.	7,068,739
Quicksilver-----	383 flasks	26,510
Stone, miscellaneous-----	-----	8,081
Unapportioned*-----	-----	1,051,845
Total-----		\$8,680,173

* Includes bituminous rock, diatomite, mineral water.

SANTA CLARA

Land area: 1328 square miles.

Population: 144,921 (1930 census).

Location: West-central portion of State.

County seat: San Jose.

References: State Mineralogist Report XVII : XVIII : XX : XXVI (Jan., 1930) : XXIX.

Santa Clara County reported a mineral output for 1935 of \$312,676, as compared with the 1934 figures of \$386,445.

In thirty-fifth place with ten mineral substances, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Brick-----	3,886 M	\$44,541
Clay, pottery-----	2,778 tons	2,263
Limestone (shells)-----	30,613 tons	71,381
Quicksilver-----	81 flasks	5,474
Stone, miscellaneous-----	-----	112,043
Unapportioned*-----	-----	76,974
Total-----		\$312,676

* Includes gems (jasper) magnesite, natural gas, petroleum.

SANTA CRUZ

Land area: 435 square miles.

Population: 37,405 (1930 census).

Location: Bordering Pacific Ocean, just south of San Mateo County.

County seat: Santa Cruz.

References: State Mineralogist Report XVII : XVIII : XXII (Jan., 1926) : XXIX.

The mineral output of Santa Cruz County, a portion of which is itemized below, amounted to a total of \$1,533,433 for 1935 giving the county a standing of twentieth among all others in the State in this regard. This is an increase over the 1934 figures of \$1,796,844.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$617
Silver-----	8 fine ozs.	6
Stone, miscellaneous-----	-----	78,743
Unapportioned*-----	-----	1,454,067
Total-----	-----	\$1,533,433

* Includes bituminous rock, cement, lime, limestone, marble (limestone).

SHASTA

Land area: 3858 square miles.

Population: 13,925 (1930 census).

Location: North-central portion of State.

County seat: Redding.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XXII (April, 1926) : XXIX (Jan., April, 1933) : XXX.

Shasta County stood twenty-second in California among the mineral producing counties in 1935, with an output valued at \$1,350,262 as compared with the 1934 production worth \$1,145,180.

With nine mineral substances, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$962,448
Copper-----	6,178 lbs.	513
Lead-----	1,747 lbs.	70
Silver-----	33,121 fine ozs.	23,805
Stone, miscellaneous-----	-----	72,850
Unapportioned*-----	-----	290,576
Total-----	-----	\$1,350,262

* Includes chromite and pyrite.

SIERRA

Land area: 923 square miles.

Population: 2419 (1930 census).

Location: Eastern border of State just north of Nevada County.

County seat: Downieville.

References: State Mineralogist Report XVI : XVII : XVIII : XX : XXV (April, 1929) : XXXI.

Sierra County reported a mineral production of \$860,716 in 1935 which was mainly gold, as compared with the 1934 output worth \$1,046,307.

In twenty-sixth place, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$841,218
Copper-----	1,612 lbs.	134
Lead-----	964 lbs.	38
Silver-----	4,532 fine ozs.	3,257
Stone, miscellaneous-----	-----	16,069
Total-----	-----	<u>\$860,716</u>

SISKIYOU

Land area: 6256 square miles.

Population: 25,505 (1930 census).

Location: Extreme north-central portion of State, next to Oregon boundary.

County seat: Yreka.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXI (Oct., 1925) : XXVIII (Jan., 1931) : XXIX : XXX : XXXI (July, 1935).

Siskiyou, fifth county in California in regard to size, located in a highly mineralized and mountainous country, ranks twenty-eighth in regard to mineral output with eight mineral substances for 1935. The 1934 production was valued at \$648,166.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$575,676
Silver-----	2,240 fine ozs.	1,610
Stone, miscellaneous-----	-----	66,664
Unapportioned*-----	-----	61,787
Total-----	-----	<u>\$705,737</u>

* Includes copper, mineral water, pumice, tube-mill pebbles.

SOLANO

Land area: 822 square miles.

Population: 40,807 (1930 census).

Location: Touching San Francisco Bay on the northeast.

County seat: Fairfield.

Solano, while mostly valley land, produced mineral substances during the year 1935 to the total value of \$7,450, ranking it fifty-fifth among the counties of the State, compared with the 1934 output worth \$23,641.

Commercial production was as follows:

<i>Substance</i>	<i>Value</i>
Onyx and travertine-----	\$5,450
Stone, miscellaneous-----	2,000
Total-----	<u>\$7,450</u>

SONOMA

Land area: 822 square miles.

Population: 62,248 (1930 census).

Location: South of Mendocino County, bordering on the Pacific Ocean.

County seat Santa Rosa.

References: State Mineralogist Report XIV : XVII : XVIII : XXII (July, 1926).

Sonoma County ranked forty-first among the counties of California during 1935 with a mineral output valued at \$170,800 as compared with the 1934 figures of \$162,005.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Granite (volcanic rock)-----	-----	\$11,380
Mineral water-----	24,474 gals.	4,295
Quicksilver-----	110 flasks	7,845
Stone, miscellaneous-----	-----	146,963
Gold-----	-----	317
Total-----	-----	\$170,800

STANISLAUS

Land area: 1450 square miles.

Population: 56,624 (1930 census).

Location: Center of State, bounded on south by Merced County.

County seat: Modesto.

References: State Mineralogist Report XIV : XVII : XVIII : XXI (April, 1925).

Gold has usually been the chief mineral product of Stanislaus County, but it was exceeded in 1918-1919 by manganese, and in 1921-1923 and 1925-1930 by miscellaneous stone. This county for 1935 ranked twenty-ninth in the State in regard to minerals, with an output valued at \$585,656 as compared with \$418,172 in 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$293,129
Silver-----	1,064 fine ozs.	765
Stone, miscellaneous-----	-----	111,912
Unapportioned*-----	-----	179,850
Total-----	-----	\$585,656

* Includes clay (pottery) and magnesite.

SUTTER

Land area: 608 square miles.

Population: 14,618 (1930 census).

Location: Bounded by Butte County on the north and Sacramento on the south.

County seat: Yuba City.

References: State Mineralogist Report XV : XVII : XVIII.

Sutter is one of only two counties in the State which for a number of years reported no commercial output of some kind of mineral substance. In 1917 some crushed rock was taken out, from the Marysville Buttes, also in 1925-1928.

There has been some utilization of natural gas. Both clay and coal exist here, but deposits of neither mineral have been placed on a

productive basis. During 1935, there was a mineral output, which was valued at \$357.

TEHAMA

Land area: 2893 miles.

Population: 13,839 (1930 census).

Location: North-central portion of the State, bounded on the north by Shasta.

County seat: Red Bluff.

References: State Mineralogist Report XV : XVII : XVIII : XIX : XXIV (July, 1928).

Tehama County stood fifty-second among the mineral producing counties of the State for 1935, with an output valued at \$11,391 as compared with the 1934 yield worth \$39,575.

<i>Substance</i>	<i>Value</i>
Gold -----	\$177
Stone, miscellaneous-----	11,214
Total -----	<u>\$11,391</u>

TRINITY

Land area: 3166 square miles.

Population: 2811 (1930 census).

Location: Northwestern portion of State.

County seat: Weaverville.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXII (Jan., 1926) : XXIX (Jan., April, 1933) : XXX.

Trinity County's 1935 output of minerals was valued at \$745,186, as compared with the 1934 figures of \$650,620, mainly due to gold which gives the county the rank of twenty-seventh for the year.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$727,787
Silver-----	3,487 fine ozs.	2,506
Stone, miscellaneous-----	-----	3,803
Unapportioned*-----	-----	11,090
Total-----	-----	<u>\$745,186</u>

* Includes coal, copper, lead, quicksilver.

TULARE

Land area: 4856 square miles.

Population: 77,375 (1930 census).

Location: Bounded by Inyo on the east, Kern on the south, Fresno on the north.

County seat: Visalia.

References: State Mineralogist Report XV : XVII : XVIII : XX.

Tulare County stands forty-sixth on the list of mineral producing counties for 1935, with eight different mineral substances, having a total value of \$53,911 as compared with the 1934 figures of \$184,474.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$952
Silver-----	13 fine ozs.	9
Stone, miscellaneous-----	-----	27,607
Unapportioned*-----	-----	25,343
Total-----	-----	\$53,911

* Includes barite, brick, granite, natural gas, petroleum.

TUOLUMNE

Land area: 2190 square miles.

Population: 9239 (1930 census).

Location: East-central portion of State—Mother Lode District.

County seat: Sonora.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXIV (Jan., 1928).

Tuolumne County ranks thirtieth among the counties of the State relative to its total value of mineral output for 1935 with ten different substances. This county ranks first as a producer of marble in the State. The mineral production for 1935 was valued at \$474,610 as compared with \$423,588 for 1934.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$286,062
Silver-----	2,753 fine ozs.	1,979
Stone, miscellaneous-----	-----	39,350
Unapportioned*-----	-----	147,219
Total-----	-----	\$474,610

* Includes copper, lead, lime, limestone, marble, slate.

VENTURA

Land area: 1878 square miles.

Population: 54,577 (1930 census).

Location: Southwestern portion of State, bordering on Pacific Ocean.

County seat: Ventura.

References: State Mineralogist Report XV : XVII : XVIII : XX : XXI : XXVIII (July-Oct., 1932).

Ventura is fifth county in the State in respect to the value of its mineral output for 1935. The 1935 mineral production was worth \$14,236,946 as compared with the 1934 output valued at \$13,688,749.

With eleven different mineral substances, commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$6,783
Natural gas-----	39,278,994 M cu. ft.	2,036,287
Petroleum-----	13,333,298 bbls.	12,016,509
Silver-----	44 fine ozs.	32
Stone, miscellaneous-----	-----	166,553
Unapportioned*-----	-----	10,782
Total-----	-----	\$14,236,946

* Includes brick and hollow building tile, clay (pottery), copper, 'granite' (volcanic rock).

YOLO

Land area: 1017 square miles.

Population: 23,618 (1930 census).

Location: Sacramento Valley, bounded by Sutter on the east and Colusa on the north.

County seat: Woodland.

References: State Mineralogist Report XIV : XVII : XVIII.

Yolo County in fiftieth place has a commercial production for 1935 as follows, compared with \$38,027 for the preceding year:

<i>Substance</i>	<i>Value</i>
Gold -----	\$715
Stone, miscellaneous -----	33,950
Total -----	<u>\$34,665</u>

YUBA

Land area: 639 square miles.

Population: 11,327 (1930 census).

Location: Lies west of Sierra and Nevada counties; south of Plumas.

County seat: Marysville.

References: State Mineralogist Report XV : XVII : XVIII : XX : XXVI (July, 1930) : XXXI.

Yuba County ranked sixteenth among the counties of the State as a mineral producer and fourth in respect to gold, which is obtained mainly by dredgers. The 1934 output was valued at \$1,951,046.

Commercial production for 1935 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold -----	-----	\$1,806,355
Silver -----	3,751 fine ozs.	2,696
Stone, miscellaneous -----	-----	32,163
Unapportioned -----	-----	7
Total -----		<u>\$1,841,221</u>



CHAPTER VIII

DIRECTORY OF PRODUCERS OF METALLIC AND NONMETALLIC MINERALS IN CALIFORNIA, 1935

NOTE—The producers of natural gas and petroleum will be found in the Quarterly Summary of Operations, California Oil Fields, for July, August and September, 1935 (Vol. 21, No. 1).

BARITE

Operator	Address	Location of mine
<i>Mariposa County</i> National Pigments Co.....	Russ Bldg., San Francisco.....	El Portal
<i>Plumas County</i> Synthetic Iron Color Co.....	P.O. Box 1157, Richmond.....	Almanor
<i>Tulare County</i> Z. E. Page.....	129 Honolulu St., Lindsay.....	Camp Nelson

BENTONITE (FULLER'S EARTH)

Operator	Address	Location of mine
<i>Inyo County</i> Chamberlain Co., Inc.....	2550 E. 9th St., Los Angeles.....	Olancha
<i>Kern County</i> Muroc Clay Co.....	5525 Randolph St., Maywood.....	Muroc
<i>San Benito County</i> D. L. Stewart Property, A. P. Stewart, Lessee.....	1052 Vermont St., San Jose.....	Tres Pinos
<i>San Bernardino County</i> California Talc Co.....	837 Jackson St., Los Angeles.....	Ilector
Hollie H. Thew.....	515 4th St., San Bernardino.....	Ilector
Velvet-White Mines, Wm. M. Hewson, Operator.....	Helendale.....	Helendale
<i>San Diego County</i> Standard Oil of California, E. W. Wagy.....	Standard Oil Bldg., San Francisco.....	Palm Siding

BITUMINOUS ROCK

Operator	Address	Location of mine
<i>Santa Barbara County</i> Higgins Quarry, D. A. Sattler, Lessee.....	856 Arguello Rd., Santa Barbara.....	Carpinteria
<i>Santa Cruz County</i> Calrock Asphalt Co.....	525 Market St., San Francisco.....	Majoros

BORATES

Operator	Address	Location of mine
<i>Inyo County</i> Pacific Alkali Co.....	1209 Pacific Mutual Bldg., Los Angeles.....	Bartlett
<i>Kern County</i> Pacific Coast Borax Co.....	1014 Central Bldg., Los Angeles.....	Kramer
<i>San Bernardino County</i> American Potash and Chemical Corp..... West End Chemical Co.....	Trona..... Syndicate Bldg., Oakland.....	Trona Searles Lake

BROMINE

Operator	Address	Location of mine
<i>Alameda County</i> California Chemical Co.....	Mills Tower, San Francisco.....	Newark
<i>San Diego County</i> California Chemical Co.....	Mills Tower, San Francisco.....	San Diego

CALCIUM CHLORIDE

Operator	Address	Location of mine
<i>San Bernardino County</i> California Rock Salt Co.....	2465 Hunter St., Los Angeles.....	Amboy

CARBON DIOXIDE GAS

Operator	Address	Location of wells
<i>Imperial County,</i> Pacific-Imperial Dri-Ice, Inc., Carl M. Einhart, Pres.....	Niland.....	Niland

CEMENT

Operator	Address	Location of mine
<i>Calaveras County</i> Calaveras Cement Co.....	315 Montgomery St., San Francisco.....	San Andreas
<i>Contra Costa County</i> Henry Cowell Lime and Cement Co.....	2 Market St., San Francisco.....	Cowell
<i>Kern County</i> Monolith Portland Cement Co.....	Bartlett Bldg., Los Angeles.....	Monolith
<i>Los Angeles County</i> Blue Diamond Corp.....	1650 S. Maineda St., Los Angeles.....	Los Angeles
<i>Merced County</i> Yosemite Portland Cement Co.....	Merced.....	Merced
<i>Riverside County</i> Riverside Cement Co.....	624 S. Hope St., Los Angeles.....	Riverside
<i>San Bernardino County</i> California Portland Cement Co.....	601 W. 5th St., Los Angeles.....	Colton
Southwestern Portland Cement Co.....	503 Roosevelt Bldg., Los Angeles.....	Victorville
<i>San Mateo County</i> Pacific Portland Cement Co.....	111 Sutter St., San Francisco.....	Redwood City
<i>Santa Cruz County</i> Santa Cruz Portland Cement Co.....	Crocker Bldg., San Francisco.....	Davenport

CHROMITE

Operator	Remarks	Address	Location of mine
<i>Fresno County</i> Bradley & Ekstrom.....	s	320 Market St., San Francisco.....	Tollhouse
<i>Napa County</i> C. Cicero & Co.....	s	Napa.....	Napa
<i>Placer County</i> Daniel Sullivan.....	s	Alta.....	Dutch Flat

s. Shipped ore, mined prior to 1935. o. Both mined and shipped in 1935.

CLAY

(Including producers of crude clay and manufacturers of brick, tile, porcelain, etc.)

Operator	Remarks	Address	Location of plant or pit
<i>Alameda County</i>			
California Pottery Co.	a, c	Niles	Niles
N. Clark & Sons	a, b, c	116 Natomas St., San Francisco	Alameda
Livermore Fire Brick Work and California Brick Plant, W. S.			
Dickey Clay Mfg. Co.	a, b, c	116 New Montgomery St., San Francisco	Livermore and Fabrico
Interlocking Tile Co.	a, c	Niles	Niles
Kraftile Co., L. J. Layton	a, b, c	Niles	Decoto
M & S Tile Co.	a, c	Decoto	Pleasanton
Remillard Brick Co., R. C. Giroux, Secy.	b	569 3d St., Oakland	Oakland
F. R. Stuve	a	717 45th Ave., Oakland	Albany
Technical Porcelain and China Ware Co.	a	420 Kains Ave., Albany, via Berkeley	Emeryville
Emeryville Porcelain Works, Westinghouse Elec. & Mfg. Co.	a	62d and Green Sts., Emeryville	Berkeley
Walrich Pottery	a	1285 Hearst Ave., Berkeley	
<i>Madro County</i>			
M. J. Bacon	c	Lone	Carbondale
Lone Clay and Sand Pit, Cal. Mineral Products Co.	c, f	Kohl Bldg., San Francisco	Lone
Carlyle Clay Deposits, E. E. Trenain	c	Buena Vista, via R.F.D., Lone	Buena Vista
N. Clark & Sons	c	116 Natomas St., San Francisco	Lone
Clay Corp. of California	c	1267 Russ Bldg., San Francisco	Lone
Lone Clay Pit, W. S. Dickey Clay Mfg. Co.	c	116 New Montgomery St., San Francisco	Lone
Lone Fire Brick Co., J. T. Roberts, Mgr.	b	1267 Russ Bldg., San Francisco	Lone
<i>Butte County</i>			
Table Mt. Clay Prod. Co., L. F. Riley, Pres. and Mgr.	b	706 Veatch St., Oroville	Oroville
<i>Calaveras County</i>			
California Pottery Co.	c	Niles	Valley Springs
<i>Contra Costa County</i>			
California Art Tile Corp.	a	Box 1116, Richmond	Richmond
Old Mission Tile Co.	a, c	1 20th St., Richmond	San Pablo
Port Costa Brick Works, C. G. Berg, Pres.	b	6th and Berry Sts., San Francisco	Port Costa
Ed Roberts	c, f	Pittsburg	Pittsburg
Standard Sanitary Mfg. Co., H. W. Creeger, Mgr.	a	Box W. Richmond	Richmond
Stockton Fire Brick Co.	b	Russ Bldg., San Francisco	Pittsburg
United Materials & Richmond Brick Co., Ltd.	a, b, c	P.O. Box 7, Richmond	Richmond
<i>Fresno County</i>			
Crayeroft Brick Co.	a, b	Griffith-McKenzie Bldg., Fresno	Fresno
<i>Humboldt County</i>			
D. J. Thompson Brick Co.	a, b, c	Box 16, Myrtle Ave., Eureka	Eureka

<i>Inyo County</i> Chamberlain Co., Inc.	2550 E. 9th St., Los Angeles	Olancha
<i>Kern County</i> Bakersfield Sandstone Brick Co., Jas. Curran, Mgr. King Lumber Co. Mojave Corp.	Bakersfield 1402 King St., Bakersfield Box 174, Los Nietos	Bakersfield Bakersfield Muroc
<i>Los Angeles County</i> Alhambra Kilns, Inc., L. C. Merwin	Alhambra	Alhambra and Santa Monica
American Refractories Co.	3132 E. Pico Blvd., Los Angeles	Los Angeles
Angulo Tile Plant	Reseda	Reseda
Bacheelder-Wilson Tile Co.*	2633 Artesian St., Los Angeles	Los Angeles
J. A. Bauer Pottery Co.	415 W. Ave. 33, Los Angeles	Los Angeles
J. Booth	1775 Stanford, Santa Monica	Santa Monica
Builders Brick Co., Ltd.	177th and Western Aves., Moneta	Moneta
Claycroft Potteries, Fred H. Robertson	3101 San Fernando Blvd., Los Angeles	Los Angeles
H. F. Coors Co., Inc.	Ingewood	Ingewood
Davidson Brick Co.	4701 Floral Dr., Los Angeles	Los Angeles
Eljer California Co.	4100 Alameda, Los Angeles	Arcadia
Enesco Refractories Co.	5601 S. Boyle Ave., Vernon	Vernon
Gladding, McBean & Co., Tropico, L. A. & S. M. Plants	660 Market St., San Francisco	Tropico, Los Angeles, Santa Monica, Hermosa Beach and Vernon
Haclo Tile & Pottery Co.	2304 E. 52d St., Los Angeles	Los Angeles
Higgins Brick & Tile Works, James R. Higgins	P.O. Box 1225, Moneta	Moneta
Italian Terra Cotta Co.	1149 Mission Rd., Los Angeles	Los Angeles
K & K Brick Co., Geo. H. Snyder, Pres.	606 Union Bank Bldg., Los Angeles	Bishop Canyon
Long Beach Brick Co., Inc., H. A. Havner, Mgr.	422 E. Broadway, Long Beach	Long Beach
Markoff Mosaic Tile Corp.	1107 E. Redondo Blvd., Ingewood	Ingewood
Myers Pottery Co.	2318 E. 52d St., Los Angeles	Los Angeles
Pacific Clay Products	650 Chamber of Commerce Bldg., Los Angeles	Los Angeles and Los Nietos
Pomona Brick Co., Wm. McMullen, Mgr.	Pomona	Pomona
Pomona Tile Mfg. Co.	Pomona	Pomona
San Vallec Tile Kilns, R. F. Stubver, Mgr.	6601 Wilbur, Reseda	Reseda
Santa Catalina Island Co., Wm. Wrigley, Jr.	Avadon	Santa Catalina Island
St. Louis Fire Brick and Clay, Joseph Mesmer	3050 E. Shaulson St., Los Angeles	Los Angeles
Simons Brick Co., Walter R. Simons	1195 S. Boyle Ave., Los Angeles	Los Angeles
Standard Brick Co.	1760 S. Soto St., Los Angeles	Los Angeles
Star Brick Co.	Moneta	Moneta
Tillotson Clay Products	3363 Fruitland Rd., Vernon	Vernon
Vernon Potteries	2300 E. 52d St., Los Angeles	Vernon
Vitrofrax Corp.	5100 Pacific Ave., Los Angeles	Vernon
<i>Marin County</i> McNear Brick Co.	McNear Point, San Rafael	McNear

*Sold to J. A. Bauer Pottery Co., November, 1935.

a. Clay products. b. Brick and hollow building tile. c. Crude clay. d. Oil-well drilling-mud. e. Filtering clay. f. Fire sand.

CLAY—Continued

(Including producers of crude clay and manufacturers of brick, tile, porcelain, etc.)

Operator	Remarks	Address	Location of plant or pit
<i>Orange County</i>			
Arnold Clay Mine, I. P. Arnold.....	c, f	1846 W. 83d St., Los Angeles.....	El Toro
Gladding, McBean & Co.....	c	660 Market St., San Francisco.....	Hector
La Bolsa Tile Co., A. W. Griffith.....	a, b, c	R.F.D. 1, Box 174, Huntington Beach.....	Smeltzer
Mission Clay Products Co.....	a, b, c	Olive.....	Office
C. O. Newton.....	c	823 Hickory St., Santa Ana.....	Capistrano
<i>Placer County</i>			
Clay Corp. of Cal.....	c	1267 Russ Bldg., San Francisco.....	Lincoln
Gladding, McBean & Co.....	a, b, c	5th floor, 660 Market St., San Francisco.....	Lincoln
Lincoln Clay Products Co., M. J. Dillman, Mgr.....	c	Lincoln.....	Lincoln
<i>Riverside County</i>			
Alberhill Coal and Clay Co.....	c	2406 E. 58th St., Los Angeles.....	Alberhill
Gladding, McBean & Co.....	a, b, c	660 Market St., San Francisco.....	Alberhill
Los Angeles Brick Co.....	a, b, c	1078 Mission Rd., Los Angeles.....	Alberhill
Pacific Clay Products.....	c	650 Chamber of Commerce Bldg., Los Angeles.....	Corona
Temescal Clay Co.....	c	5601 S. Boyle Ave., Los Angeles.....	Temescal
<i>Sacramento County</i>			
Cannon & Co.....	a, b, c	Box 802, Sacramento.....	Ben Ali
H. C. Muddox, Jessie E. Muddox, owner.....	a, b	30th and L Sts., Sacramento.....	Sacramento
Sacramento Brick Co.....	b	1400 Front St., Sacramento.....	Sacramento
Valley Brick Co.....	b	P.O. Box 1180, Sacramento.....	Sacramento
<i>San Benito County</i>			
D. L. Stewart Property, A. P. Stewart, lessee.....	c	1052 Vermont, San Jose.....	Tres Pinos
<i>San Bernardino County</i>			
California Tile Co.....	c	837 Jackson St., Los Angeles.....	Hector
Hancock Brick Yard, C. P. Hancock & Son.....	b	4330 Lemon St., Riverside.....	Highgrove
Hart Clay Deposit, W. K. S. Keoch, lessee.....	c	2022 Thayer Ave., Los Angeles.....	Goffis
Kennedy Clay Pit, John Kennedy.....	c	1306 3/4 Warren Ave., Los Angeles.....	Daggett
Standard Sanitary Mfg. Co., Pacific Mines, P. R. Jones, Mgr.....	c	Campos.....	Hart
J. H. Stone.....	c	Barstow.....	Barstow
Hollie H. Thew.....	c	515 4th St., San Bernardino.....	Hector
Velvet-White Mines, Wm. M. Hewson.....	c	Helendale.....	Helendale
<i>San Diego County</i>			
Pacific Clay Products Co.....	c	650 Chamber of Commerce Bldg., Los Angeles.....	Farr Station
Standard Oil Co. of California.....	c	Standard Oil Bldg., San Francisco.....	Palm Siding
Union Brick Co., J. W. Rice.....	b	3565 3d St., North San Diego.....	Rose Canyon
Vitrified Products Corp.....	a, b, c	2841 Jefferson St., North San Diego.....	North San Diego

<i>San Joaquin County</i> San Joaquin Brick Co., J. F. Stein, Secy. Stockton Brick & Tile Co.	b b	33 S. El Dorado St., Stockton McKinley Ave., Stockton	Stockton Stockton
<i>San Luis Obispo County</i> Antelope Mud Co., W. G. Angus, Mgr. San Luis Brick Works, Faulstich Bros.	d b, d	Box 204, Lost Hills San Luis Obispo	Cholame San Luis Obispo
<i>San Mateo County</i> Richmond Potteries, Inc.	a	Box 187, South San Francisco	South San Francisco
<i>Santa Clara County</i> Coyote Creek Clay Beds, L. R. Lenfest Garden City Pottery, N. J. Mahone Gladding Bros. Mfg. Co. Handeraft Tile Co., L. W. Austin et al. Remillard Brick Co. San Jose Brick Co. S. & S. Tile Co.	c a a, b, c a b, c b a	1195 E. Santa Clara St., San Jose 560 N. 6th St., San Jose South 3d and Keyes Sts., San Jose R.F.D. 2, Box 121A, San Jose 569 3d St., Oakland P.O. Box 274, San Jose 1881 S. 1st St., San Jose	San Jose San Jose San Jose San Jose San Jose San Jose San Jose
<i>Stanislaus County</i> Coopertown Clay Deposit, J. H. Hornsby	c	651 Cumberland St., Pittsburg	Coopertown
<i>Tulare County</i> San Joaquin Materials Co.	b	744 G St., Fresno	Exeter
<i>Ventura County</i> Peoples Lumber Co., C. E. Bonestel, Mgr. Shell Oil Co., Dent Clay Pit	a, b, c d	708 E. Meta St., Ventura Shell Bldg., San Francisco	Ventura Ventura

a. Clay products. b. Brick and hollow building tile. c. Crude clay. d. Oil-well drilling-mud. e. Filtering clay.

COAL

Operator	Address	Location of mine
<i>Amador County</i> Buena Vista Coal Mining Co., J. J. Morras, Supt.....	Ione, c/o R.F.D.....	Buena Vista
<i>Monterey County</i> Monterey Coal Corp.*.....	111 Sutter St., San Francisco.....	Stone Canyon
<i>Trinity County</i> Thomas E. Reese.....	Douglas City.....	Douglas City

*Now abandoned.

COPPER

Principal Copper Producers in California in 1935

Mine	Operator	Address	Location of mine
<i>Alameda County</i> Alma.....	Blowski Copper Co.....	1328 Trestle Glen, Oakland.....	Leona Heights
<i>Inyo County</i> Cardinal.....	Cardinal Gold Mining Co., Bin D. Bishop.....	972 S. 4th St., Los Angeles.....	Keeler
<i>Nevada County</i> Empire North Star Pennsylvania Empress..... Lava Cap..... San Juan..... Spanish.....	Empire Star Mines Co., Inc..... Republic Gold Mining Corp..... Lava Cap Gold Mining Corp..... Bradley Mining Co..... San Francisco Commercial Co.....	14 Wall St., New York, N. Y..... Box 914, Grass Valley..... Box 780, Grass Valley..... Crocker Bldg., San Francisco..... Crocker Bldg., San Francisco.....	Grass Valley Grass Valley Grass Valley North San Juan Washington
<i>Plumas County</i> Walker.....	Walker Mining Co.....	818 Kearns Bldg., Salt Lake City, Utah.....	Walker Mine

DIATOMITE (DIATOMACEOUS EARTH)

Operator	Address	Location of quarry or mine
<i>Fresno County</i> Mineral Products Mfg. Co., T. H. Elliott and L. J. Allen A. P. Shepard	3464 Ventura St., Fresno 3101 Mariposa St., Fresno	Mendota Mendota
<i>Los Angeles County</i> The Dicalite Co. Raylite Aggregates, Inc., W. M. Sutherland, Pres.	756 S. Broadway, Los Angeles 1106 Detwiler Bldg., Los Angeles	San Pedro Palos Verdes
<i>Monterey County</i> Pacatone, Ltd.	Bradley	Bradley
<i>Santa Barbara County</i> Johns Manville Products Corp. National Silica Products Co., C. E. Miller	Lompoc 1201 Bryant St., Palo Alto	Lompoc Lompoc

DOLOMITE

Operator	Address	Location of quarry
<i>Inyo County</i> Inyo Marble Co.	726-732 E. 29th St., Los Angeles	Keeler
<i>Monterey County</i> Pacific Coast Steel Corp., Sterling Ranch Quarry	20th and Illinois Sts., San Francisco	Natividad

FELDSPAR

Operator	Address	Location of mine
<i>San Diego County</i> Chamberlain Co., Inc. Standard Sanitary Mfg. Co., P. R. Jones, Mgr.	2550 E. 9th St., Los Angeles Campo	Jacumba Campo

GOLD

Principal Gold Producers in California out of a Total of 2,599 Placer Operators and Lode Mines in 1935

Mine	Type of mine	Operator	Address	Location of mine
<i>Amador County</i>				
Argonaut	a	Argonaut Mining Co., Ltd.	1404 Humboldt Bank Bldg., San Francisco	Jackson
Argonaut Tailings Dump	c	Hill & Hambric	Box 16, Jackson	Jackson
Arroyo Seco	c	Arroyo Seco Gold Dredging Co.	351 California St., San Francisco	lone
Buena Vista	g	Lancha Plana Hydraulic Mines Co., Alvin G. Ekel	lone	lone
Central Eureka	a	Central Eureka Mining Co.	111 Sutter St., San Francisco	Sutter Creek
Central Eureka Tailings Dump	c	Central Tailings Co.	564 Market St., San Francisco	Sutter Creek
Fort Ann	a	Fort Ann Mining Co., J. C. Nimmo	Volcano	Volcano
Kennedy	a, c	Kennedy Mining and Milling Co.	519 California St., San Francisco	Martell
Lancha Plana	c	Lancha Plana Gold Dredging Co.	Canamache	Canamache
Original Anador	a	Original Anador Gold Mines	Anador City	Anador City
Petersen (Levezzo)	a	W. F. Petersen	Jackson	Jackson
Voorheis Dump	c	American Smelting & Refining Co.	405 Montgomery St., San Francisco	Martell
Dump of all old mines near lone	c	Delta Tailings Co.	564 Market St., San Francisco	lone
<i>Butte County</i>				
Biggs	c	Yuba Consolidated Gold Fields	351 California St., San Francisco	Rio Bonita
Casod Ranch	h	L. H. Kryer	Oroville	Oroville
Cineo	h	Cineo Mineros Co.	Box 212, Oroville	Oroville
Gianella	h	Olsen & Kronquest	Richvale	Richvale
Hintz	k	A. C. O'Neal	52 N. E. Tillamook St., Portland, Ore.	Big Butte Creek
Hintz	k	Clarence Young	Oaks Hotel, Chico	Big Butte Creek
Las Plumas (Surceuse)	a	Hoedling Bros., Inc.	1000 4th St., Sacramento	Yankee Hill
New Era	f	J. O. Gaumer	R.F.D. 1, Oroville	Oroville
Palermo	c	Palermo Dredging Co.	Oroville	Oroville
Sadie King	h	Lord & Bishop	Native Sons Bldg., Sacramento	Oroville
Thurman Hill	c	Oroville Gold Dredging Co.	Box 86, Oroville	Oroville
Jack Welch	h	Laurence Neal	Oroville	Oroville
Wyandotte Creek	h	Wyandotte Gold Dredging Co., H. G. English, Mgr.	Box 3, Oroville	Oroville
<i>Calaveras County</i>				
Boston	a	Boston Mokelumne Mining Co., F. C. Moore, Supt.	Mokelumne Hill	Mokelumne Hill
Bright Star	a	Russell Gold Mining Co.	Angels Camp	Angels Camp
Calaveras	a	Mar John Mines Co., P. B. Russell, Supt.	Sheep Ranch	Sheep Ranch

<i>Calaveras Central</i>	<i>Calaveras Central Gold Mining Co., Ltd.</i>	58 Sutter St., San Francisco.....	Angels Camp
<i>Calaveras Columbus</i>	<i>Woodhouse Mining Co.</i>	112 Market St., San Francisco.....	West Point
<i>Carson Hill</i>	<i>Carson Hill Gold Mine Corp.</i>	Sonora.....	Melons
<i>Canamache Placers</i>	<i>Canamache Placers, Inc.</i>	Canamache.....	Canamache
<i>Easy Bird</i>	<i>Lucky Joe Gold Mining Co.</i>	Box 292, Jackson.....	San Andreas
<i>Foster Ranch</i>	<i>Comanche Gold Dredging Co.</i>	311 California St., San Francisco.....	Comanche
<i>Golden River (Bishop)</i>	<i>Golden River Mining Co.</i>	Trans-America Bldg., Los Angeles.....	Angels Camp
<i>Lloyd</i>	<i>Charles W. Nielsen</i>	San Andreas.....	San Andreas
<i>Plug Ugly</i>	<i>Buck Bros.</i>	San Andreas.....	San Andreas
<i>Royal</i>	<i>Frank S. Tower</i>	Milton.....	Milton
<i>Sand Pit</i>	<i>Gold Gravel Producers, Inc.</i>	Wallace.....	Wallace
<i>South Gulch</i>	<i>E. L. Lilly</i>	1844 Carmel Ave., Stockton.....	Jenny Lind
<i>South Gulch & Clear Creek</i>	<i>Milton Gold Dredging Enterprise, K. G. Schwigler</i>	405 Montgomery St., San Francisco.....	Milton
<i>Vallecito Western</i>	<i>Tonopah Belmont Dev. Co.</i>	Angels Camp.....	Angels Camp
<i>El Dorado County</i>			
<i>Beebe</i>	<i>The Beebe Gold Mining Co.</i>	Crocker Bldg., San Francisco.....	Georgetown
<i>Black Oak</i>	<i>Russell J. & Edwin W. Wilson</i>	Garden Valley.....	Garden Valley
<i>Big Canyon</i>	<i>The Mountain Copper Co., Ltd.</i>	351 California St., San Francisco.....	Shingle
<i>Blue Rock</i>	<i>Canyon Creek Dredge, J. E. Croulance, trustee</i>		
<i>Briarcliffe</i>	<i>Briarcliffe Mines, Ltd.</i>	Russ Bldg., San Francisco.....	Georgetown
<i>Carpenter</i>	<i>M. A. McGinley</i>	Box 156, Plymouth.....	Plymouth
<i>Gold Reserve</i>	<i>George W. Pelcier</i>	Biltmore Hotel, Los Angeles.....	Placerville
<i>Kelsey</i>	<i>Kelsey Mining Co., Inc.</i>	c/o Bank of America, 8th and J Sts., Sacramento.....	Placerville
<i>Landecker</i>	<i>P. B. Butler et al.</i>	519 California St., San Francisco.....	Placerville
<i>Lookout</i>	<i>Lloyd E. Hill and P. J. Lovless</i>	426 S. Roxberry Dr., Beverly Hills.....	Placerville
<i>Montezuma</i>	<i>Montezuma-Apex Mining Co.</i>	El Dorado.....	El Dorado
<i>River Bar Lotus</i>	<i>Placers, Inc., R. A. Healy</i>	Box M, Placerville.....	Placerville
<i>Slinger</i>	<i>Middle Fork Gold Mining Co.</i>	Placerville.....	Lotus
		Box M, Auburn.....	Greenwood
<i>Fresno County</i>			
<i>Grant Service Gravel Pit</i>	<i>Grant Service Rock Co.</i>	509 T. W. Patterson Bldg., Fresno.....	Friant
<i>Humboldt County</i>			
<i>Pearch</i>	<i>P. L. Young</i>	Orleans.....	Orleans
<i>Imperial County</i>			
<i>Cargo Muchacho</i>	<i>Holmes & Nicholson Mining & Milling Co., Riggs & Horgan</i>	Box 828, Yuma, Ariz.....	Ogilby
<i>Tunco</i>		Ogilby.....	Ogilby
<i>Inyo County</i>			
<i>Cardinal</i>	<i>Cardinal Gold Mining Co.</i>	Bin D., Bishop.....	Bishop Creek
<i>Gold Dust</i>	<i>Keeler Gold Mines, Inc.</i>	972 S. 4th St., Los Angeles.....	Koeler
<i>Golden Treasure</i>	<i>Golden Treasure Mines, Inc.</i>	5410 Wilshire Blvd., Los Angeles.....	Shoshone
<i>Orondo</i>	<i>The Orondo Mines Co.</i>	1028 S. Wall St., Los Angeles.....	Trona
<i>Reward (Brown Monster)</i>	<i>Inyo Mines, Inc.</i>	Yermo.....	Yermo
<i>Silver Ball</i>	<i>Gray & Worcester Mining Co.</i>	Beatty, Nev.....	Beatty Valley

a. Lode gold mine. b. Placer (sluicing) mines. c. Tailings dumps. d. Pocket. e. Dredge (bucket line). f. Drift mine. g. Hydraulic mine. h. Dragline dredge. k. Power shovel. j. Copper-gold mine. l. Silver-gold mine.

GOLD—Continued

Principal Gold Producers in California out of a Total of 2,599 Placer Operators and Lode Mines in 1935

Mine	Type of mine	Operator	Address	Location of mine
<i>Kern County</i>				
Big Blue	a	Big Blue Mining Co.	Kernville	Kernville
Big Butte	a	Butte Lode Mining Co., E. L. Wegmann	Randsburg	Randsburg
Big Dike	a	Anglo American Mining Co.	Mills Bldg., San Francisco	Randsburg
Buckboard & Baltic	a	E. P. Ferry	308 E. Lomita St., Glendale	Randsburg
Drunkards Dream	a	J. C. Waiser et al.	409 18th St., Bakersfield	Caliente
Elephant-Gray Eagle	a	Elephant-Eagle Mines and 17 Lessees	Bank of America Bldg., Los Angeles	Soledad Mountain
Middle Butte	a	Burton & Britte	Rosamond	Mojave
Minnehaha	a	E. B. Maginnis et al.	Box 228, Randsburg	Randsburg
Silver Queen	a	Golden Queen Mining Co.	Mojave	Mojave
Soledad Extension	a	Soledad Mojave Mining Co.	Mojave	Mojave
Tropico	a	Burton Bros., Inc.	Rosamond	Rosamond
Yellow-Aster	a	Anglo American Mining Corp.	Mills Bldg., San Francisco	Randsburg
<i>Los Angeles County</i>				
Allison	a	V. F. Kirchhoff	151 N. Florence St., Burbank	Azusa
Big Horn	a	Big Horn Mine Co.	610 Brisbane Bldg., Buffalo, N. Y.	Valyermo
Big Susanna	a	Rogers & Gentry	Farmont	Farmont
Boquet Canyon	b	Soledad Placer Co.	726 Washington Bldg., Los Angeles	Boquet Canyon
Governor	a	Governor Mining Co.	729 Figueroa St., Los Angeles	Frazier Park
Valview	a	Ventura-Neenach Mining Co., et al.	Lancaster	Lancaster
<i>Madera County</i>				
Enterprise	a	P. H. Collins	Raymond	Ahwahnee
<i>Mariposa County</i>				
Diltz	a	E. R. Baker et al.	1518 14th St., Sacramento	Whitlock
Doss	a	Doss Mining Co.	Matson Bldg., San Francisco	Hornitos
Ferguson	a	Original Mining & Milling Co.	510 18th St., Merced	Incline
French	a	C. C. Baker	Bear Valley	Bear Valley
Pine Tree and Josephine	a	Pacific Mining Co., A. V. Udell, Mgr.	Crocker Bldg., San Francisco	Bear Valley
Ruth Pierce	a	Ernest L. Buckle	Hornitos	Hornitos
Schroeder	a	Pehrson, Rodgers & Pehrson	Mariposa	Mariposa
<i>Merced County</i>				
Kelsey Ranch	k	Frank B. Marks	Newman	Merced Falls
Kelsey Ranch	h	Kramer & Arnold	Box 25, Merced	Merced Falls
Merced	c	Merced Dredging Co.	Mills Bldg., San Francisco	Snelling
Merced Unit	c	Yuba Consolidated Gold Fields	351 California St., San Francisco	Snelling
Snelling	e	Snelling Gold Dredging Co.	Snelling	Snelling

[illegible]

a. Lode gold mine. b. Placer (sluicing) mines. c. Tailings dumps. d. Pocket. e. Dredge (bucket line). f. Drift mine. g. Hydraulic mine. h. Dragline dredge.
k. Power shovel. j. Copper-gold mine. l. Silver-gold mine.

GOLD—Continued

Principal Gold Producers in California out of a Total of 2,599 Placer Operators and Lode Mines in 1935

Mine	Type of mine	Operator	Address	Location of mine
<i>Placer County—Continued</i>				
Rawhide	a	Canyon Mines Corp.	144 Kearny St., San Francisco	Dutch Flat
Reynolds	h	Jasper-Stacy Co., trustee	216 Pine St., San Francisco	Lincoln
Ross	h	E. B. Skeels	190 Orange St., Auburn	Auburn
Three Queens	a	J. T. Boyd	Placerville	Forest Hill
T. W. A.	a	T. W. A. Mines, Inc.	11 W. Hollman Bldg., Los Angeles	Auburn
Wortell Ranch	h	Lincoln Gold Dredging Co.	Box 334, Lincoln	Lincoln
<i>Plumas County</i>				
Mary Ann	a	R. A. Vermillion & Geo. D. French	1001 E. Slanson Ave., Los Angeles	La Porte
Walker	j	Walker Mining Co.	818 Kearns Bldg., Salt Lake City, Utah	Walker mine
<i>Riverside County</i>				
Ducky Boy	a	E. Anclair	Box 35, Twenty-nine Palms	Twenty-nine Palms
Gold Crown & Nightingale	a	Gold Crown Mining Co., Ltd.	730 Petroleum Securities Bldg., Los Angeles	Twenty-nine Palms
Red Cloud	a	S. & W. Mine Development Co., B. F. Schmidt	2250 Crenshaw Bldg., Los Angeles	Mecca
<i>Sacramento County</i>				
Capitol	c	Capital Dredging Co.	351 California St., San Francisco	Folsom
Natomas	c	Natomas Co.	Forum Bldg., Sacramento	Natomas
Willow Hill	c	Gold Hill Dredging Co.	311 California St., San Francisco	Folsom
<i>San Bernardino County</i>				
Atolia-Rand Placers	b	Atolia-Rand Placers, Inc.	215 W. 5th St., Los Angeles	Atolia
Branigan	a	Butler & Roper	Box 231, Mecca	Mecca
Coyote	l	C. O. Mittendorf	Red Mountain	Red Mountain
Kelly	a	Kelly Gold & Silver Mines, Inc., Frank W. Roper	606 Hill St., Los Angeles	Randsburg
Orlando	b	The Orlando Mines	6th and D Sts., San Bernardino	Twenty-nine Palms
Supply	a	Supply Mining Co., Lessor	536 Hill St., Los Angeles	Iravupah
Vanderbilt	a	Atascadero Mining Co.	Atascadero	Amboy
Vulcan	a	John M. Fink	Amboy	
<i>San Joaquin County</i>				
Mikes Gulch	h	Kunde & Ferris	Le Grand	Clements
<i>Shasta County</i>				
Dry Creek	h	Midland Co.	733 Dwight Way, Berkeley	Cottonwood
Iron Mountain	a	The Mountain Copper Co., Ltd.	351 California St., San Francisco	Matheson
Milk Maid	a	J. H. Scott Co.	Merchants Exchange Bldg., San Francisco	French Gulch
Tiler	h	Pioneer Gold Dredging Co.	Redding	Redding
Yankee John	a	Rich Strike Gold Mine, Inc.	Box 309, Redding	Redding

GRANITE

Operator	Product	Address	Location of quarry
<i>Fresno County</i> Academy Granite Superior Granite Co., Inc.	a a	Clovis Clovis	Clovis Academy
<i>Lassen County</i> A. D. Greig, Greig Quarry	a	Susanville	Susanville
<i>Madera County</i> Kingsland Granite Co. McGilvray Raymond Corp.	a a	Box 156, Madera 3 Potrero Ave., San Francisco	Bates Station Raymond
<i>Mariposa County</i> Yosemite National Park	a	Yosemite	Yosemite Park
<i>Nevada County</i> Netz Granite Quarry, Ludwig Netz	a	Nevada City	Nevada City
<i>Placer County</i> Victor Wickman	a	Rocklin	Rocklin
<i>Plumas County</i> Paul Sonognini	a	Chilecoot	Chilecoot
<i>Sacramento County</i> Folsom State Prison	a	Represa	Represa
<i>San Diego County</i> American Marble & Granite Works Crystal Black Quarry, John Stridsburg Matson & Deering, Meyers Quarry McGilvray-Raymond Corp., Lakeside Quarry	a a a a	1212 E. 9th St., Los Angeles Escondido Lakeside 678 S. Anderson St., Los Angeles	Santee Spooks Canyon Lakeside Lakeside
<i>Sonoma County</i> S. Cabrol L. R. DeChesne Ernest Laurent	b c b, c	Glen Ellen Glen Ellen Kenwood	Glen Ellen Glen Ellen Kenwood
<i>Tulare County</i> Sequoia Nat'l Park	a	Three Rivers	Sequoia Nat'l Park
<i>Ventura County</i> Ritchie Bros., R. A. Ritchie and J. A. Ritchie	c	Fillmore	Grimes Canyon

a. Granite used in building and monumental stone. b. Tuff used as building stone. c. Volcanic rock used as flagstone.

GRAPHITE

Operator	Address	Location of plant
<i>Los Angeles County</i> Western Graphite Co.	337 W. Ave. 26, Los Angeles	Lake Hughes

GYPSUM

Operator	Address	Location of quarry
<i>Fresno County</i> Dos Palos Gypsum Co., O. L. Divens and A. A. Conrowe Green & Collins Paoli Gypsum Mine, A. P. Shepard, Mgr.	Dos Palos Ceres 3101 Mariposa St., Fresno	S. Dos Palos Mendota Mendota
<i>Imperial County</i> Imperial Gypsum Quarry, Pac. Portland Cement	111 Sutter St., San Francisco	Plaster City
<i>Riverside County</i> U. S. Gypsum Co.	300 W. Adams St., Chicago, Ill.	Midland

IODINE

Operator	Address	Mine
<i>Los Angeles County</i> I. O. Dow Chemical Co.	310 Santiago Ave., Long Beach	Long Beach

IRON

Mine	Operator	Address	Location of mine
<i>San Bernardino County</i> Cave Canyon..... Iron Hat Group.....	A. S. Vincell Co. Tom Schofield.....	969 Amelia Ave., Los Angeles Cadiz.....	Baxter Cadiz.....

LEAD

Principal Lead Producers in California in 1935

Mine	Operator	Address	Location of mine
<i>Inyo County</i> Carbonate..... Contact No. 7..... Custer..... Estelle & Cerro Gordo..... Estelle & Cerro Gordo..... Leary..... Santa Rosa.....	John P. Madison & H. L. Hillwig..... B. M. & C. E. Clay..... J. C. & John F. Baxter..... Estelle Mines Corp..... Silver Lead Syndicate..... F. R. Long, Inc..... Santa Rosa Mines & Development Co., J. R. LeCyr..... J. W. Austin..... Sierra Tale Co., Franklin Booth, Mgr.....	490 Post St., San Francisco..... Chloride Cliffs, via Beatty, Nevada..... Independence..... 972 S. 4th St., Los Angeles..... 502 Scott Bldg., Salt Lake City, Utah..... Richfield Bldg., Los Angeles..... Keeler..... Keeler..... 428 Union League Bldg., Los Angeles.....	Shoshone Chloride Cliff Owens Keeler Keeler Keeler Keeler Keeler
<i>Nevada County</i> Empire North Star Pennsylvania & Zellbright..... Empress..... Lava Cap..... Spanish.....	Empire Star Mines Co., Inc..... Republic Gold Mining Corp..... Lava Cap Gold Mining Corp..... San Francisco Commercial Co.....	14 Wall St., New York, N. Y..... Box 914, Grass Valley..... Box 780, Nevada City..... Crocker Bldg., San Francisco.....	Grass Valley Grass Valley Nevada City Washington
<i>Orange County</i> Blue Light.....	Hughes Mitchell Processes Co.....	Box 147, Torrance.....	Silverado
<i>Riverside County</i> Black Eagle.....	Eagle Mining & Refining Co.....	453 S. Spring St., Los Angeles.....	Coachella
<i>San Bernardino County</i> Burcham.....	Maurice Mulcahy.....	Daggett.....	Daggett

LIME AND LIMESTONE

Operator	Product	Address	Location of quarry
<i>Alameda County</i> California Chemical Co.	a, d	Mills Tower, San Francisco	Newark
<i>El Dorado County</i> Auburn Chemical Lime Co., Ltd. Diamond Springs Lime Co. El Dorado Limestone Co., J. H. Bell, Mgr. Pac. Portland Cement Co., Cons.	a, b a, b, c b, c b	Auburn Diamond Springs Diamond Springs 111 Sutter St., San Francisco	Newcastle Diamond Springs Diamond Springs Auburn
<i>Fresno County</i> Coral Reef Lime Corp., B. F. Mason, Mgr.	c, e	Dinuba	Reedley
<i>San Bernardino County</i> Cal. Portland Cement Co. Chubbuck Lime Co., Chas. I. Chubbuck Victoryville Lime Rock Co.	a a, b, c b	1228 Pac. Mutual Bldg., Los Angeles 5000 Worth St., Los Angeles 356 S. Mission Rd., Los Angeles	Colton Chubbuck Victoryville
<i>San Mateo County</i> Pacific Portland Cement Co.	c, d	111 Sutter St., San Francisco	San Mateo
<i>Santa Clara County</i> Bay Shell Co. L. H. Beck W. B. Ortle, Shell Co.	c, d c, d c, d c, d	503 Market St., San Francisco P.O. Box 113, Colma Alviso	Alviso Alviso Alviso
<i>Santa Cruz County</i> Henry Cowell Lime and Cement Co., W. H. George, Mgr. Holmes Lime & Cement Co. Pacific Limestone Prod. Co.	a, b a b	2 Market St., San Francisco Division and De Haro Sts., San Francisco Spring St., Santa Cruz	Santa Cruz Felton Santa Cruz
<i>Tuolumne County</i> McLean Quarry, W. S. McLean U. S. Lime Products Corp.	b a, b	419 Bayshore Blvd., San Francisco 85 2d St., San Francisco	McLean Spur Sonora

a, Producer of burnt lime, b, Producer of limestone, c, Agricultural lime, d, Shells, e, Marl.

MAGNESITE

Operator	Address	Location of mine
<i>Santa Clara County</i> California Chemical Co., lessee, Western Magnesite Mine.....	Mills Tower, San Francisco.....	Red Mountain
<i>Stanislaus County</i> California Chemical Co., Bald Eagle Mine.....	Mills Tower, San Francisco.....	Gustine

MAGNESIUM SALTS

Operator	Product	Address	Location of plant
<i>San Diego County</i> California Chemical Co.....	Chloride	Mills Tower, San Francisco.....	San Diego
<i>San Mateo County</i> Marine Chemical Co., R. E. Clarke Plant Rubber & Asbestos Works.....	Carbonate Carbonate	South San Francisco..... 537 Brannan St., San Francisco.....	South San Francisco Redwood City

MANGANESE ORE

Operator	Address	Location of mine
<i>Riverside County</i> Bradley & Ekstrom Langdon Mine.....	320 Market St., San Francisco.....	Midland

MARBLE (including Onyx and Travertine)

Operator	Product	Address	Location of quarry
<i>Santa Cruz County</i> Pacific Limestone Prod. Co.....	b	Santa Cruz.....	Santa Cruz
<i>Solano County</i> P. Grassi & Co.....	c	1945 San Bruno Ave., San Francisco.....	Cement
Toleneas Springs Onyx, L. Cardini.....	c	121 14th St., San Francisco.....	Toleneas Springs
<i>Tuolumne County</i> The Columbia Marble Co., R. H. Van Norden, Secy.....	a	413 Rialto Bldg., San Francisco.....	Columbia

a. Marble. b. Limestone. c. Onyx and travertine.

MICA

Operator	Address	Location of property
<i>Imperial County</i> Micatale Co.....	1557 Courtney Ave., Hollywood, Cal.....	Ogilby

MINERAL PAINT

Operator	Address	Location of property
<i>Placer County</i> Synthetic Iron Color Co.....	Richmond.....	Forest Hill

MINERAL WATER

Operator	Address	Location of spring
<i>Butte County</i> Feather River Canyon Spring Water Co., R. E. Chappell Richardson Springs, Lee Richardson, Mgr.	2215 L St., Sacramento Chico	Pulga Chico
<i>Calaveras County</i> Mok-Hill Mineral Springs, L. Walkmoister	Sutter Creek	Sutter Creek
<i>Contra Costa County</i> Alhambra Water Co.	Martinez	Martinez
<i>El Dorado County</i> Digger Indian Natural Medicinal Water Co.	Randall	Randall
<i>Lake County</i> Adams Mineral Springs, Clarence Prather Bartlett Spring Co. Norman Mineral Springs, H. C. Norman, Mgr. Witter Mineral Springs, W. E. Whitaker	Adams, via Middletown 681 Geary St., San Francisco Middletown 995 Market St., San Francisco	Adams Bartlett Springs Middletown Witter Springs
<i>Los Angeles County</i> Cascade Water Co. Elysian Spring Water Co. Holly Spring Water Magnetic Spring Water Co. Mission Spring Water Co. Pure-lax Mineral Water Co. Sparklett Drinking Water Co. Tarzana Mineral Water Co.	4556 York Blvd., Los Angeles 1536 Baxter, Los Angeles 2298 Holly Dr., Los Angeles 936 Palm Ave., Sherman 8938 Keith, Hollywood 3640 Griffin, Los Angeles 4500 York Blvd., Los Angeles 1485 N. Vine	Los Angeles Los Angeles Los Angeles Los Angeles Hollywood Los Angeles Los Angeles Los Angeles
<i>Marin County</i> Purity Spring Water Co.	2032 Kearny St., San Francisco	Sausalito
<i>Napa County</i> Calistoga Bottling Works, E. E. Hardies Napa Soda Springs, G. H. T. Jackson Sannels Soda Spring, Mrs. Robert J. Little	Calistoga 7 Front St., San Francisco Monticello	Calistoga Napa Monticello
<i>Orange County</i> La Vida Mineral Water Co.	804 Spring Arcade Bldg., Los Angeles	Carbon Canyon
<i>Riverside County</i> Beulah Springs, Oscar C. McNicholl	Arlington	Arlington
<i>San Bernardino County</i> Arrowhead Hot Springs, California Cons. Water Co.	1566 E. Washington Blvd., Los Angeles	Arrowhead

PLATINUM

Principal Platinum Producers in California in 1935

Operator	Address	Location of mine
<i>San Diego County</i> Rock Springs Co., E. S. Walek..... San Diego Ice & Cold Storage Co.....	Rt. 2, Box 442, Escondido..... 67 8th St., San Diego.....	Escondido
<i>San Francisco County</i> Blue Crest Beverage Co..... Diamond Rock Spring Water Co., L. Paolinelli.....	615 Excelsior Ave., San Francisco..... 247 Naples St., San Francisco.....	San Francisco San Francisco
<i>San Luis Obispo County</i> Crystal Spring Water Co., W. R. Hudson..... Superior Spring Water Co.....	R.F.D. 2, Box 11, San Luis Obispo..... c/o Sandercock Trans. Co., San Luis Obispo.....	San Luis Obispo San Luis Obispo
<i>Santa Barbara County</i> Veronica Mineral Springs Co.....	699 Brannan St., San Francisco.....	Santa Barbara
<i>Siskiyou County</i> The Shasta Water Co..... Yreka Coco Cola Bottling Works, Fred J. Mcumber, Prop.....	6th and Brannan Sts., San Francisco..... Yreka.....	Dunsmuir Little Shasta
<i>Sonoma County</i> Agua Caliente Springs Co., T. H. Corcoran, Prop..... Barcal Springs, John Kolling..... Fetters Mineral Springs, George Fetters.....	Agua Caliente..... Preston..... Fetters Springs.....	Agua Caliente Preston Fetters Springs
<i>Merced County</i> Merced Dredging Co., B..... Yuba Consolidated Gold Fields B.....	Mills Bldg., San Francisco..... 351 California St., San Francisco.....	Snelling Snelling
<i>Sacramento County</i> Capital Dredging Co., B..... Gold Hill Dredging Co., A..... Natomas Co., A.....	Balfour Bldg., San Francisco..... 311 California St., San Francisco..... Forum Bldg., Sacramento.....	Folsom Folsom Natomas
<i>Stanislaus County</i> La Grange Gold Dredging Co., B.....	Mills Bldg., San Francisco.....	La Grange
<i>Yuba County</i> Yuba Consolidated Gold Fields B.....	351 California St., San Francisco.....	Hammonden

A Produced and sold. B Produced but not sold.

POTASH

Operator	Address	Location of plant
<i>San Bernardino County</i> American Potash and Chemical Co.....	Trona.....	Trona

PUMICE OR VOLCANIC ASH

Operator	Product	Address	Location of quarry
<i>Imperial County</i> Chamberlain Co., Inc.....	a	2550 E. Ninth St., Los Angeles.....	Calipatria
<i>Inyo County</i> Chas. Brown.....	a	Shoshone.....	Shoshone
Little Lake Pumice Co.....	a	4232 S. Produce Pl., Los Angeles.....	Coso Junction
Tonopah & Tidewater Ry.....	b	1014 Central Bldg., Los Angeles.....	Shoshone
<i>Kern County</i> Cudahy Packing Co.....	b	803 Macy St., Los Angeles.....	Ceneda
<i>Madera County</i> Bennet & Jordan*.....	b	Box 283, Selma.....	Friant
Friant Pumicite Co., Earl R. Carper.....	b	816 Pacific Southwest Bldg., Fresno.....	Friant
<i>Mono County</i> California Quarries Corp.....	a	1300 Quinby Bldg., Los Angeles.....	Laws
<i>Napa County</i> Pearl Pumice Quarries, Jas. H. Pearl.....	a	565 Monticello Rd., Napa.....	Monticello
<i>San Luis Obispo County</i> Gray Eagle Mine, M. L. Francis.....	b	Creston.....	Creston
<i>Siskiyou County</i> E. L. Jamerson, J. O. Miller, & Dan A. Williams.....	a	217 Monterey St., Salinas.....	Mount Shasta

a. Pumice. b. Volcanic Ash.

* Now operated by Friant Pumicite Co.

PYRITE

Operator	Address	Location of mine
<i>Alameda County</i> Leona Chemical Co., D. A. McDonnell	Syndicate Bldg., Oakland	Leona Heights
<i>Shasta County</i> Mountain Copper Co., Wm. F. Kett, Mgr.	112 Market St., San Francisco	Matheson

QUICKSILVER

Principal Quicksilver Producers in California for 1935 out of a Total of 63 Operating Properties

Mine	Operator	Address	Location of mine
<i>Inyo County</i> Coso Hot Springs	J. F. Sanders	Little Lake	Coso
<i>Kings County</i> Frediana	Frediana Mining Co., E. K. Anderson, Mgr.	Parkfield	Parkfield
<i>Lake County</i> Great Western	Bumsted Mining Co., E. J. Bumsted, Mgr.	Middletown	Middletown
Helen	L. S. Peterson	Middletown	Middletown
Mirabel	Mirabel Quicksilver Co.	Middletown	Middletown
Red Elephant	Big Six Mining Co., C. P. Morecy	Box 211, Calistoga	Reiff
Sulphur Bank	Sulphur Bank Syndicate, W. Bradley, Mgr.	Crocker Bldg., San Francisco	Lower Lake
<i>Monterey County</i> Dawson Pit	Frank Coerlla	Parkfield	Parkfield
<i>Napa County</i> Aetna	E. W. Erickson	Middletown	Aetna Springs
Knoxville	Geo. F. Gamble	1431 Waverly St., Palo Alto	Monticello
Oat Hill	Oat Hill Mine, Inc., Norman B. Livermore	369 Pine St., San Francisco	Aetna Springs
Switzer Property	Frank Adams	Pope Valley	Pope Valley

QUICKSILVER—Continued
Principal Quicksilver Producers in California for 1935 out of a Total of 66 Operating Properties

Mine	Operator	Address	Location of mine
<i>San Benito County</i>			
Alpine.....	Harry A. Leonard Co.....	Hollister.....	Hernandez
Aurora.....	Peter Bual.....	Paicines.....	Idria
Florence Mac Mine.....	Rex Smith.....	Hernandez.....	Hernandez
Idria.....	New Idria Quicksilver Mines, Inc.....	Mer. Exch. Bldg., San Francisco.....	Idria
Stayton.....	R. B. Knox.....	Hollister.....	Hollister
<i>San Luis Obispo County</i>			
Klan.....	Klan Mine, Inc.....	Pent House, Mills Bldg., San Francisco.....	Adelaida
Oceanic.....	Anglo American Mining Corp.....	Mills Bldg., San Francisco.....	Cambria
Polar Star.....	E. D. Rogers.....	San Simeon.....	San Simeon
<i>Santa Barbara County</i>			
Lion Den.....	Lion Den Mercury Co., J. G. Moore.....	Los Olivos.....	Buelton
Los Prietos.....	Ray Wyatt.....	Box 277, Santa Barbara.....	Santa Barbara
Red Rock.....	Santa Ynez Mercury Co., Oscar E. Hanno, Mgr.....	Solvang.....	Solvang
<i>Santa Clara County</i>			
Little Almaden.....	Little Almaden Mining Co.....	Almaden.....	Almaden
New Almaden Dump.....	C. E. Watson Mining Co.....	R.F.D. 3, Box 349, Los Gatos.....	Almaden
<i>Sonoma County</i>			
Cloverdale.....	Cavagnaro & Schor.....	Cloverdale.....	Cloverdale
Culver-Baer.....	Davey Mining Co.....	Cloverdale.....	Cloverdale
Esperanza.....	Jas. G. Cortelyou.....	Cloverdale.....	Cloverdale
<i>Trinity County</i>			
Altoona.....	Altoona Quicksilver Mining Co., J. Frowenfield, Pres.....	2446 Washington St., San Francisco.....	Castella

SALT

Operator	Address	Location of plant
<i>Alameda County</i> Arden Salt Co. California et al. Plants, Leslie-California Salt Co.	225 Bush St., San Francisco. 110 Sansome St., San Francisco.	Newark and Mt. Eden Alvarado
<i>Imperial County</i> Imperial Salt Co.	4000 E. Washington Blvd., Los Angeles.	Calipatria
<i>Kern County</i> Long Beach Salt Co.	P.O. Box 28, Long Beach.	Saltdale
<i>Los Angeles County</i> Long Beach Salt Co.	P.O. Box 28, Long Beach.	Long Beach
<i>Modoc County</i> Surprise Valley Salt Works, Joshua H. Hutchinson	Box 26, Cedarville.	Lake City
<i>Monterey County</i> Monterey Bay Salt Co., E. C. Vierra, Mgr.	Moss Landing.	Moss Landing
<i>San Bernardino County</i> California Rock-Salt Co. Rock Salt Products Co.	2465 Hunter St., Los Angeles. 845 El Centro St., South Pasadena.	Amboy Salt Marsh
<i>San Diego County</i> Western Salt Co.	917 J. D. Spreckels Bldg., San Diego.	San Diego
<i>San Mateo County</i> Stauffer Chemical Co.	636 California St., San Francisco.	Redwood City

SANDSTONE

Operator	Address	Location of quarry
<i>Los Angeles County</i> Alphonso Bell Corp. Binder Bros., W. H. Binder	10601 Chalon Rd., Bel-Air, Los Angeles. 285 N. Lake Ave., Pasadena	Bel-Air Boquet Canyon
<i>Monterey County</i> Carmel Stone Quarry, A. L. Passadori Sierra Quarry, Harry Rogers Andrew Stewart	Carmel Box 136, Carmel Carmel Valley	Carmel Carmel Carmel Valley
<i>San Luis Obispo County</i> Mora Bros.	Box 121, Cambria	Cambria

SILICA

Operator	Product	Address	Location of mine
<i>Contra Costa County</i> Hazel-Atlas Glass Co. of California, Ltd. Silica Co. of California, Ltd.	b b	89th Ave. and G St., Oakland 405 Montgomery St., San Francisco	Summerville Brentwood
<i>Orange County</i> Arnold Clay Mine, I. P. Arnold	b	1846 W. 83d St., Los Angeles	El Toro
<i>Placer County</i> Elmore Hill Placer Mines, Mrs. A. F. W. Delius	a	Box 38, Alta	Alta
<i>Riverside County</i> P. J. Weiscl, Inc.	a	La Habra	Corona
<i>San Bernardino</i> Temescal Clay Co.	c	5601 S. Boyle Ave., Los Angeles	Hicks
<i>San Diego County</i> Chamberlain Co., Inc. Standard Sanitary Mfg. Co., R. P. Jones, Mgr.	a a	2550 E. 9th St., Los Angeles Campo	Jacumba Campo

a. Quartz. b. Glass sand. c. Quartzite.

SILIMANITE—ANDALUSITE—KYANITE GROUP

Operator	Product	Address	Location of mine
<i>Imperial County</i> Vitrofrax Corp.....	Kyanite	5050 Pacific St., Vernon, Los Angeles.....	Ogilby
<i>Mono County</i> Champion Spark Plug Co., Ceramic Division.....	Andalusite	Butler Ave. and Grand Trunk R. R., Detroit, Mich.....	Mocalno

SILVER

Principal Silver Producers in California in 1935

Mine	Type of mine	Operator	Address	Location of mine
<i>Amador County</i> Argonaut.....	a	Argonaut Mining Co., Ltd.....	1404 Humboldt Bank Bldg., San Francisco.....	Jackson
Fort Ann.....	a	Fort Ann Mining Co., J. C. Nimmo.....	Volcano.....	Volcano
Kennedy.....	a	Kennedy Mining and Milling Co.....	519 California St., San Francisco.....	Martell
Voorheis Dump.....	a	American Smelting & Ref. Co.....	405 Montgomery St., San Francisco.....	Martell
<i>Butte County</i> Las Plumas (Surecase).....	a	Hoefling Bros., Inc.....	1000 4th St., Sacramento.....	Yankee Hill
<i>Calaveras County</i> Carson Hill.....	a	Carson Hill Gold Mines Corp.....	Sonora.....	Melons
<i>El Dorado County</i> Gold Reserve.....	a	George W. Pelton.....	e/o Bank of America, 8th and J Sts., Sacramento.....	Placerville
Montezuma.....	a	Montezuma Apex Mining Co.....	Box M, Placerville.....	Placerville
<i>Imperial County</i> Cargo Muchacho.....	a	Holmes & Nicholson Mining & Milling Co.....	Box 828, Yuma, Ariz.....	Ogilby

a. Gold. b. Silver. c. Copper. d. Lead-silver. e. Gold dredge. f. Gold, silver.

SILVER—Continued

Principal Silver Producers in California in 1935

Mine	Type of mine	Operator	Address	Location of mine
<i>Inyo County</i>				
Carbonate	d	John P. Madison and H. L. Hellwig	490 Post St., San Francisco	Shoshone
Cardinal	a	Cardinal Gold Mining Co., Ben D. Bishop	972 S. 4th St., Los Angeles	Bishop
Estelle & Cerro Gordo	d	Estelle Mining Corp.	972 S. 4th St., Los Angeles	Keeler
Estelle & Cerro Gordo	d	Silver Lead Syndicate	502 Scott Bldg., Salt Lake City, Utah	Keeler
Leary	d	F. R. Long, Inc.	Richfield Bldg., Los Angeles	Keeler
Santa Rosa	d	Santa Rosa Mines & Development Co., J. R. Le Cyp	Keeler	Keeler
<i>Kern County</i>				
Big Blue	a	Big Blue Mining Co.	Kernville	Kernville
Cactus Queen	b	Cactus Mines Co., Geo. B. Kimball	Box 418, Ojai	Fleta
Elephant Eagle	a	Elephant-Eagle Mines and 17 lessees	Bank of America Bldg., Los Angeles	Soledad Mountain
Gold Bug	f	International Mining & Milling Co.	Randsburg	Inyokern
Middle Butte	a	Burton & Britte	Rosamond	Mojave
Silver Queen	a	Golden Queen Mining Co.	Mojave	Mojave
Soledad Extension	a	Soledad Mojave Mining Co.	Mojave	Mojave
Tropico	a	Barton Bros., Inc.	Rosamond	Rosamond
Yellow Aster	a	Anglo American Mining Corp.	Mills Bldg., San Francisco	Randsburg
<i>Los Angeles County</i>				
Big Susanna	a	Rogers & Gentry	Fairmont	Fairmont
Valview	a	Ventura Neenach Mining Co.	Lancaster	Lancaster
<i>Mariposa County</i>				
Blue Moon	a	Herbert J. Kelm	914 21st St., Merced	Merced
Pine Tree & Josephine	a	Pacific Mining Co.	Crocker Bldg., San Francisco	Bear Valley
<i>Mono County</i>				
Silverado	b	Sierra Cons. Mines, Inc.	Sweetwater	Sweetwater
<i>Napa County</i>				
Falsades	b	Coast Range Mining Co.	700 La Brea Ave., Los Angeles	Calistoga

<i>Nevada County</i>						
Empire, North Star	a	Empire Star Mines Co., Inc.	14 Wall St., New York, N. Y.	Grass Valley		
Empress	a	Republic Gold Mining Co.	Box 914, Grass Valley	Grass Valley		
Golden Center & Scotia	a	Cooley Butler	Rowan Bldg., Los Angeles	Grass Valley		
Idaho Maryland	a	Idaho Maryland Mines Corp.	Russ Bldg., San Francisco	Grass Valley		
Lava Cap	a	Lava Cap Gold Mining Corp.	Box 780, Nevada City	Nevada City		
San Juan	a	Bradley Mining Co.	Crocker Bldg., San Francisco	North San Juan		
Spanish	a	San Francisco Commercial Co.	Crocker Bldg., San Francisco	Washington		
<i>Orange County</i>						
Blue Light	d	Hughes Mitchell Processes Co.	Box 147, Torrance	Silverado		
<i>Placer County</i>						
Alabama	a	Alabama California Gold Mines Co.	Box 155, Auburn	Penryn		
Auburn Chicago	a	Auburn Chicago Mines Corp.	Citizens Nat. Bank Bldg., Los Angeles	Penryn		
Dairy Farm	a	Dairy Farm Gold Corp.	Box 326, Lincoln	Lincoln		
T W A	a	T W A Mines, Inc.	H. W. Hellman Bldg., Los Angeles	Auburn		
<i>Plumas County</i>						
Walker	e	Walker Mining Co.	818 Kearns Bldg., Salt Lake, Utah	Walkerville		
<i>San Bernardino County</i>						
Calico Tailings	b	Lewis Warukin	Randsburg	Randsburg		
Coyote	b	C. O. Mittendorf	Red Mountain	Red Mountain		
Kelly	f	Kelly Gold & Silver Mines, Inc., Frank W. Roper	606 Hill St., Los Angeles	Randsburg		
Santa Fe	f	Red Mountain Mining Co.	Red Mountain	Red Mountain		
Sioux	b	J. B. Osborne	Daggett	Daggett		
<i>Shasta County</i>						
Iron Mountain	a	The Mountain Copper Co., Ltd.	351 California St., San Francisco	Mathewson		
<i>Sierra County</i>						
Original 16 to 1	a	Original 16 to 1 Mines, Inc.	Russ Bldg., San Francisco	Alleghany		
<i>Yuba County</i>						
Yuba	e	Yuba Consolidated Gold Fields	351 California St., San Francisco	Hammonton		

a. Gold. b. Silver. c. Copper. d. Lead-silver. e. Gold dredge. f. Gold, silver.

SLATE

Operator	Product	Address	Location of quarry
<i>El Dorado County</i> Pacific Minerals Co., Ltd.		337 10th St., Richmond	Chili Bar
<i>Inyo County</i> Red Slate Quarry, J. D. Leary		Keeler	Keeler
<i>Tuolumne County</i> Whitney Slate Quarry, W. S. McLean		419 Bayshore Blvd., San Francisco	Hetch Hetchy

SOAPSTONE AND TALC

Operator	Product	Address	Location of mine
<i>Battle County</i> McLean Talc Deposit, W. S. McLean	a	419 Bayshore Blvd., San Francisco	McLean Spur
<i>El Dorado County</i> Pacific Minerals Co., Ltd., Chas. S. Renwick, Jr.	a	337 10th St., Richmond	Shrub
<i>Inyo County</i> The Glendinning Co., R. W. Glendinning	b	624 La Brea Ave., Los Angeles	Darwin
Sierra Talc Co., Franklin Booth, Mgr.	b	428 Union League Bldg., Los Angeles	Keeler
<i>San Bernardino County</i> Pacific Coast Talc Co.	b	2149 Bay St., Los Angeles	Silver Lake
Western Talc Co.	b	1901 E. Slauson Ave., Los Angeles	Acme

a. Soapstone. b. Talc.

SODA

Operator	Product	Address	Location of plant
<i>Inyo County</i> Natural Soda Products Co. Pacific Alkali Co.	a, b, d a	650 Spring St., Los Angeles 1206 Pacific Mutual Bldg., Los Angeles	Keeler Bartlett
<i>San Bernardino County</i> American Potash & Chemical Co. Chemical Mines Co., Irving E. Bush West End Chemical Co.	a, c c a	Trona 1116 Pacific Mutual Bldg., Los Angeles 706 Syndicate Bldg., Oakland	Trona Twenty-Nine Palms West End

a. Soda ash. b. Sodium bicarbonate. c. Salt cake. d. Trona.

STONE, MISCELLANEOUS

Under the heading of 'miscellaneous stone' there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.

NOTE.—The California State Highway Commission, U. S. Bureau of Public Roads and U. S. Forest Service produce both crushed rock and sand and gravel in various places in the State used in construction and maintenance of highways, but not specified in this listing.

Operator	Product	Address	Location of pit or quarry
<i>Alameda County</i> California Rock & Gravel Co. Farmers Land Co., Ltd. Hanifen Trucking Co. Heafey-Moore Co., Leona Quarry Irvington Gravel Co., O. N. Hirsch Kaiser Paving Kemper Bros. Langdon Molding Sand, J. H. Langdon Red Shale Quarry, W. S. McLean Pacific Coast Aggregates, Inc. Alfred W. Petersen San Leandro Rock Co., Lake Chabot Quarry	a a a b a a b c d a, b a b	500 Call Bldg., San Francisco C and 7th Sts., Hayward Pleasanton 344 High St., Oakland Irvington 1522 Latham Square Bldg., Oakland 5998 Strohbridge Ave., Hayward R.F.D., Box 89, Niles 419 Bayshore Blvd., San Francisco 85 2d St., San Francisco P.O. Box 943, Livermore 2485 Washington St., San Leandro	Livermore Hayward Pleasanton Oakland Irvington Radium Hayward Decoto Arroyo Mocho Elliot and Niles Livermore Lake Chabot
<i>Butte County</i> Bechtel-Kaiser Co., R. J. Kennedy, Mgr. Lord & Bishop McLean's Quarry, W. S. McLean Pacific Coast Aggregates, Inc.	a, b a, b d a, b	Oroville Box 547, Oroville 419 Bayshore Blvd., San Francisco 85 2d St., San Francisco	Oroville Oroville McLean Spur Oroville

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag and volcanic cinder. f. Tube-mill pebbles. g. Decomposed granite.

STONE, MISCELLANEOUS—Continued

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<i>Calaveras County</i> Pacific Minerals Co., Ltd.----- Pardee Dam, East Bay Mun. Utility Dist.-----	d b	337 10th St., Richmond. 1924 Broadway, Oakland.-----	Angels Pardee Dam
<i>Contra Costa County</i> Contra Costa County----- Antioch Asphalt Sand Co.----- Basalt Rock Co.----- Blake Bros. Co., Anson S. Blake----- Hutchison Co., Stege Quarry----- Oak Point Sand Co., Robert P. Easley, et al.----- Ed Roberts----- Silica Co. of Calif., Ltd.----- Southern Pac. R. R. Co., Asst. Chief Engr.----- L. Stamm-----	a a a b b a a, c c a a	Martinez----- 2008 Mission St., San Francisco. 8th St., Napa----- 204 Balboa Bldg., San Francisco. 1450 Harrison St., Oakland. Antioch----- Pittsburg----- Brentwood----- Southern Pacific Bldg., San Francisco. Antioch-----	Antioch Antioch Point Richmond Stege Antioch Pittsburg Brentwood Newlove Antioch
<i>Del Norte County</i> Del Norte County-----	a	Crescent City-----	-----
<i>El Dorado County</i> El Dorado County----- Diamond Springs Lime Co.-----	b b	Placerville----- Diamond Springs-----	Georgetown Diamond Springs
<i>Fresno County</i> Grant-Service Rock Co., Cons.----- Pacific Coast Aggregates, Inc.-----	a, b b	T. W. Patterson Bldg., Fresno. 85 2d St., San Francisco.-----	El Prado Piedra
<i>Glenn County</i> Southern Pacific Co.----- E. B. Bishop-----	a a	65 Market St., San Francisco. Box 325, Orland.-----	Wyo Wyo
<i>Humboldt County</i> Humboldt County----- Benbow Hotel Co.----- D. A. Boyd----- Hemstreet & Bell----- Mercer-Fraser Co.----- Northwestern Pacific R. R. Co., Wm. N. Neff, Gen. Supt.-----	a a a a, b a a	Eureka----- Benbow----- R. F. D., Arcata----- 501 11th St., Marysville. 2d and Commercial Sts., Eureka. Sausalito.-----	Benbow Arcata Essex South Fork

<i>Imperial County</i>					
Imperial Rock Corp.	b	P.O. Box 6, Niland	Niland		
<i>Inyo County</i>					
Inyo Marble Co.	b, d	726-732 E. 29th St., Los Angeles	Lone Pine		
<i>Kern County</i>					
Bakersfield Rock and Gravel Co.	a, b	Box 395, Station A, Bakersfield			
Kern Rock Co., Ltd.	a, b	P.O. Box 1697, Bakersfield	Kern River		
<i>Lake County</i>					
Charles Kuppinger	a	Lakeport	Lakeport		
Hemstreet & Bell	b	411 C St., Marysville	Upper Lake		
<i>Lassen County</i>					
Red River Lumber Co.	b	Westwood	Westwood		
<i>Los Angeles County</i>					
Arrow Rock Co.	a	P.O. Box 155, Monrovia	Monrovia		
A., T. & S. F. R. R., I. L. Hibbard, Gen. Mgr.	a	609 Kerekhoff Bldg., Los Angeles	Forbes		
Azusa Rock & Sand Co.	a, b	R.F.D., Azusa	Azusa		
Richard R. Ball	a	Box 233, Welteria	Welteria		
Bengal & Sons	a	1709 Monte Vista, Pasadena	Pasadena		
Blue Diamond Corp., Ltd.	a	1650 S. Alameda St., Los Angeles	El Monte and Roscoe		
Wm. J. Bonfield	a	2008 Laurel Canyon Rd., Los Angeles	Hollywood		
Consolidated Rock Products Co.	a, b	2730 S. Alameda St., Los Angeles	Whittier and Fullerton		
Ducey & Atwood Rock Co., R. K. Atwood, Pres.	a, b	Box 194, East Pasadena	East Pasadena		
Eaton Canyon Rock and Sand Co.	a, b	2350 E. Colorado St., Pasadena	Pasadena		
Graham Bros., Inc.	a, b, g	Long Beach	Catalina Island and Roscoe, El Monte and Rancho Quia's		
<i>Granite Material Co.</i>					
Lindauer Corp.	g	Box 363, N. Hollywood	N. Hollywood		
Los Angeles Harbor Dept., Bureau of Maintenance	a	Box 208, La Habra	La Habra		
Los Angeles Dept. of Water and Power	b	City Hall, San Pedro	Santa Catalina		
Los Angeles & Salt Lake R. R.	a	207 S. Broadway, Los Angeles			
Los Angeles Decomposed Granite Co.	a	Pacific Electric Bldg., Los Angeles			
Pacific Rock & Gravel Co.	a, b	2171 W. Washington, Los Angeles			
Reynolds Crushed Gravel	a, b	458 S. Spring St., Los Angeles	Los Angeles		
Edward Sidebotham & Son, Inc., Sidebotham Sand Plants.	b, g	920 N. Humphreys Ave., Los Angeles	Los Angeles		
State Decomposed Granite Co.	a	McFarland and L Sts., Wilmington	Lomita		
	g	2272 Laurel Canyon Blvd., Los Angeles	Hollywood		
<i>Madera County</i>					
Madera County	a	Madera			
McGillivray Raymond Corp.	b	3 Potrero Ave., San Francisco	Raymond		
<i>Marin County</i>					
Marin County	a	San Rafael	San Rafael		
Daniels Con. Co.	b	503 Market St., San Francisco			
Hutchison Company	b	1450 Harrison St., Oakland	San Quentin		

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag and volcanic cinder. f. Tube-mill pebbles. g. Decomposed granite.

STONE, MISCELLANEOUS—Continued

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<i>Mariposa County</i> Yosemite National Park.....	a, b	Yosemite.....	Yosemite National Park
<i>Mendocino County</i> Ukiah Gravel & Cement Co., John Freitas.....	a	Ukiah.....	Ukiah
<i>Merced County</i> Merced County.....	a	Merced.....	Los Banos
Fred Ragsdale.....	a, b	Merced.....	Merced
J. W. Huffman, Bair Creek Gravel Pit.....	a	Merced.....	Merced
<i>Modoc County</i> Great Northern Ry., A. E. Knight, Supt.....	c	Klamath Falls, Ore.....	Adin
Hemstreet & Bell.....	b	411 C St., Marysville.....	Knowles (Goose Lake)
Southern Pacific R.R. Co., Asst. Chief Engr.....	b	Southern Pacific Bldg., San Francisco.....	
<i>Mono County</i> L. A. Dept. of Water & Power.....	a	207 S. Broadway, Los Angeles.....	Mono Craters
<i>Monterey County</i> County Surveyor, Monterey County.....	a	Salinas.....	
Del Monte Properties Co., C. S. Olmster.....	a, c	Del Monte.....	Del Monte
M. J. Murphy.....	b	Monte Verde and 9th Sts., Carmel.....	Carmel
Pacific Coast Aggregates, Inc.....	a	85 2d St., San Francisco.....	Lapis and Pratteo
Pacific Coast Steel Corp., F. E. Watts.....	b	20th and Illinois, San Francisco.....	Natividad
S. Ruthven, Seaside Sand Pit.....	a	Seaside.....	Seaside
Southern Pacific Co.....	a	65 Market St., San Francisco.....	Lapis
<i>Napa County</i> Napa County.....	b	Napa.....	Napa
Basalt Rock Co.....	b	8th St., Napa.....	Napa
Errington Quarry, Ray Errington.....	a	Napa.....	Napa
Thorsen Gravel Pit, Harry Thorsen.....	a	St. Helena.....	St. Helena
<i>Nevada County</i> Golden Center Mine, L. S. Wincapaw, Mgr.....	b	Grass Valley.....	Grass Valley
<i>Orange County</i> Orange County.....	g	Santa Ana.....	Whittier and Fullerton
Consolidated Rock Products Co.....	a, b	i 56 S. Los Angeles St., Los Angeles.....	Santa Ana
National Cement Pipe Co.....	a	Drawer K, Santa Ana.....	Anaheim
B. A. Stoffel.....	a	Anaheim.....	Anaheim

<i>Placer County</i> Victor Wickman.....	b	Rocklin.....	Rocklin
<i>Plumas County</i> Western Pac. R. R. Co., E. W. Mason, Gen. Supt.....	b	Mills Bldg., San Francisco.....	
<i>Riverside County</i> Riverside County.....	a	Courthouse, Riverside.....	Corona
A. T. & S. F. R. R. Co., I. L. Hibbard, Gen. Mgr.....	b	609 Kerekhoff Bldg., Los Angeles.....	Thermal, Whitewater
Graham Bros.....	a	Long Beach.....	Corona
Kuster & Waterburg.....	a	Corona.....	Riverside
Riverside, City of.....	b	Riverside.....	Riverside
The Service Gravel Co., F. A. Braman.....	a	4324 10th St., Riverside.....	Corona
P. J. Welsel, Industrial Sands.....	a, c	La Habra.....	
<i>Sacramento County</i> Sacramento County.....	a	Sacramento.....	Ben Ali
Cannon & Co.....	c	North Sacramento.....	Del Paso
Del Paso Rock and Gravel Co.....	a, b	11 St. Rd., Sacramento.....	Represa
Folsom State Prison.....	b	Represa.....	Mayhews
Mucke Sand & Gravel Co.....	a, b	Mayhews.....	Fair Oaks, Mayhews and
Pacific Coast Aggregates, Inc.....	a, b	85 2d St., San Francisco.....	American River
Perkins.....	a, b	Perkins.....	Perkins
Robert Powell & Co.....	a	P.O. Box 815, Sacramento.....	American River
<i>San Benito County</i> San Benito County.....	a	Hollister.....	Logan
Granite Rock Co.....	b	Drawer M., Watsonville.....	Logan
Southern Pacific Co.....	a, b	65 Market St., San Francisco.....	
<i>San Bernardino County</i> County Highway Commissioner San Bernardino County.....	a, b	San Bernardino.....	Gale
A. T. & S. F. R. R.....	a	609 Kerekhoff Bldg., Los Angeles.....	S. Fontana
Consolidated Rock Products Co., Ltd.....	a, b	656 S. Los Angeles St., Los Angeles.....	La Verne
Delezville Stone Co., Ltd., Merritt Chapman & Scott Corp.....	b	Box 698, San Pedro.....	San Bernardino
Hanawalt Bros.....	a, b	2151 D St., La Verne.....	
Fourth Street Rock Crusher, A. O. Johnson.....	a	San Bernardino.....	Barstow
Los Angeles Dept. of Water and Power.....	a	207 S. Broadway, Los Angeles.....	Redlands
Pacific Minerals, Inc.....	d	337 10th St., Richmond.....	South Fontana
Redlands Gravel Co.....	a, b	Redlands.....	San Bernardino
Southern Pacific Co.....	b	65 Market St., San Francisco.....	
Triangle Rock & Gravel Co.....	a, b	San Bernardino.....	
<i>San Diego County</i> Calavera Rock Corp.....	b	Oceanside.....	Oceanside
Canyon Rock Co.....	a, b	3911 5th Ave., San Diego.....	San Diego
Crystal Silica Sand Co.....	a	Oceanside.....	Oceanside
H. G. Fenton Material Co.....	a	13th and Imperial Ave., San Diego.....	San Diego
R. M. Hubbard.....	c	406 W. Nutmeg St., San Diego.....	San Diego

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STONE, MISCELLANEOUS—Continued

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Operator	Product	Address	Location of pit or quarry
<i>San Diego County—Continued</i>			
John T. Monand	c	Box 381, Carlsbad	Oceanside
Nelson & Sloan	a	P.O. Box 832, Chula Vista	Chula Vista
Oceanside Rock & Sand Co.	a	Carlsbad	Oceanside
A. Morris Sides	a, d	1557 Courtney Ave., Los Angeles	
<i>San Francisco County</i>			
Mission Quarry Co.	b	210 Balboa Bldg., San Francisco	San Francisco
<i>San Joaquin County</i>			
Highway Maintenance Dept., San Joaquin County		Court House, Stockton	
J. S. Cowan	a	R.F.D. 2, Box 29, Escalon	Ryson
L. Lorentzen	a	741 Third St., Petaluma	
Frank Marks	a, b	Newman	Tracy
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Riverbank
Santa Fe Sand and Gravel Co., W. A. Arlington	a	P.O. Box 271, Escalon	Escalon
Elmer J. Warner	a	1128 E. Roosevelt St., Stockton	Stockton
<i>San Luis Obispo County</i>			
San Luis Obispo County	a	San Luis Obispo	Oceano
Guiton Molding Sand, Harold E. Guiton	c	Oceano	Santa Margarita
Gularte Gravel Pit, M. Gularte	a	Santa Margarita	Santa Margarita
Walter B. Roschup	a	615 Grand Ave., San Luis Obispo	
<i>San Mateo County</i>			
San Mateo County	b	Redwood City	Half Moon Bay
M. F. Cunha, Vasques Quarry	b	Main St., Half Moon Bay	
Golden West Quarry	b	S. San Francisco	Colma
Holy Cross Cemetery	b	Colma	
Industrial Mineral Products, W. B. Vestal	c	772 Bryant St., San Francisco	Daly City
Market St. Ry. Co., Daly's Quarry	b	58 Sutter St., San Francisco	Skyline Blvd.
Skyline Quarry, Parker Pugh	b	Box 202, Redwood City	
<i>Santa Barbara County</i>			
H. G. Huff	a	Santa Maria	Santa Maria

<i>Santa Clara County</i>			
County Quarry, Santa Clara County		Hall of Records	Saratoga
Arrowhead Gravel Co.		20 Maple Ave., Watsonville	Watsonville
Carroll Gravel Pit, R. D. Carroll	a	R.F.D. 4, Box 310A, San Jose	San Jose
A. G. Jahn	a	R.F.D. 4, Box 362, San Jose	San Jose
Jas. A. Leuieux	a	Box 341, Senter Rd., San Jose	San Jose
Los Gatos Sand and Gravel Co.	a	Los Gatos	Los Gatos
J. W. Lovejoy	b	R.F.D. 1, Box 88, Mountain View	Mountain View
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Coyote and Campbell
Rhodes & Robinson Stanford Quarry	b	Box 325, Palo Alto	Palo Alto
Southern Pacific Co.	a	65 Market St., San Francisco	Coyote
Sunnyvale Gravel Co.	a	Sunnyvale	Sunnyvale, Alamitos
Taaffe Construction Co.	b	Los Altos	Los Altos
<i>Santa Cruz County</i>			
Santa Cruz County	b	Santa Cruz	Santa Cruz
Atlas Olympia Co.	a	209 Underwood Bldg., San Francisco	Olympia
Central Supply Co.	a	P.O. Box 524, Santa Cruz	Santa Cruz
Alcad Felton Sand & Gravel Co., H. G. Mead	a	Felton	Felton
Pacific Limestone Products Co.	b	Santa Cruz	Santa Cruz
Santa Cruz Portland Cement Co.	b	Crocker Bldg., San Francisco	Davenport
<i>Shasta County</i>			
Shasta County	a, b	Redding	Redding
Diestelhorst Gravel Plant, Chas. Diestelhorst	a, b	1040 Liberty St., Redding	Lassen Nat'l Park
Lassen Volcanic Nat'l Park	b	Mineral via Red Bluff	Pit River
Pacific Gas & Elec. Co., W. G. Vincent, V. Pres. & Ex. Eng.	b	245 Market St., San Francisco	
<i>Siskiyou County</i>			
King Solomon Mines Co.	f	Crocker Bldg., San Francisco	Black Bear
W. D. Miller Const. Co.	a	Klamath Falls, Ore.	Graham Shing
Southern Pacific R. R. Co., Asst. Chief Engineer	c	Southern Pacific Bldg., San Francisco	Kegg
A. Young	a	Yreka	Yreka
<i>Sonoma County</i>			
County Surveyor & Engineer	a	Santa Rosa	Healdsburg
Basalt Rock Co.	a	8th St. Napa	Glen Ellen
S. Cabrol	b	Glen Ellen	Petaluma
Hein Bros. Basalt Rock Co., Mark Hein, Pres.	b	Petaluma	Forestville
Independent Gravel Co.	a	Forestville	Chianti
Northwest Gravel Co.	a	844-A Mills Bldg., San Francisco	Stony Point
Petaluma and Santa Rosa, E. R. R., E. H. Maggard, Mgr.	b	Petaluma	Santa Rosa
Santa Rosa Basalt Co., Jas. A. Anderson	a	5687 Miles Ave., Oakland	Stony Point
Stony Point Quarry, W. A. Wilson	b	Petaluma, Star Rt.	Stony Point

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag and volcanic cinder. f. Tube-mill pebbles. g. Decomposed granite.

STONE, MISCELLANEOUS—Continued

Under the heading of 'miscellaneous stone' there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.
 NOTE.—The California State Highway Commission, U. S. Bureau of Public Roads and U. S. Forest Service produce both crushed rock and sand and gravel in various places in the State used in construction and maintenance of highways, but not specified in this listing.

Operator	Product	Address	Location of pit or quarry
<i>Stanislaus County</i>			
Atlas Olympia Co.	a	209 Underwood Bldg., San Francisco	Orange Blossom
Hammett Gravel Plant, V. M. Hammett	a	Hughson	Hughson
W. Haslan	a	Oakdale	Oakdale
Frank B. Marks	a	Newman	Crows Landing
Oakdale Irrigation Dist., M. E. Robinson, Auditor	a	Oakdale	Oakdale
Putman Sand & Gravel Co.	a	Modesto	Modesto
Rinehart Sand Pit, Rinehart Bros.	a	Modesto	Modesto
J. P. Scanlon, Scanlon Gravel Pit	a	Patterson	Crows Landing
Southern Pacific Co.	a	65 Market St., San Francisco	Newman
Stewart Gravel Pit, John Stewart	a	Crows Landing	Crows Landing
Chas. Warner	a	Modesto	Modesto
<i>Tehama County</i>			
Hemstreet & Bell	a	411 C St., Marysville	Red Bluff
Tehama County	a, b	Red Bluff	
<i>Trinity County</i>			
Trinity County	a	Weaverville	
S. Eastwood	a	Douglas City	Douglas City
<i>Tulare County</i>			
Tulare County	g	Visalia	
J. J. Dugan & Sons	a	R.F.D. 2, Box 120, Porterville	Porterville
O. C. Jeffers	a	Star Rt. 2, Porterville	Porterville
Nelson Concrete Pipe Co., John Nelson	a	Box 32, Strathmore	Strathmore
Porterville Cement Pipe Co.	a	P.O. Box 396, Porterville	Porterville
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Lemon Cove and Lindsay
Supt. Sequoia National Park	a, b	Three Rivers	Sequoia Natl. Park
Tulare Rock Co., O. Holliday	a, b	Lindsay	Lindsay
<i>Ventura County</i>			
Ventura County	b	Ventura	
El Rio Rock Co.	a, b	P.O. Box 381, Ventura	El Rio
Montalvo Rock Co.	a	Montalvo	Montalvo
Piru Rock Co.	a, b	Piru	Piru
Santa Paula Rock Co.	a	Willard Bridge, Santa Paula	Santa Paula
Saticoy Rock Products Co.	a, b	Saticoy	Saticoy-Ventura
Ventura Velvet Molding Sand, Chas. A. Cole	c	1355 Church St., Ventura	Ventura
Southern Pacific Co.	a, b	65 Market St., San Francisco	Rockbank and Chrisman

<i>Yolo County</i> Yolo County, County Engineer C. and H. Gravel Co., J. J. Hartley Leroy Kerr Frank Newman Yolo Gravel Co.	a a a a a	Yolo Davis Yolo Woodland P. O. Box 7, Yolo	Yolo Davis Woodland Yolo
<i>Yuba County</i> Yuba County, County Clerk Henstreet & Bell N. F. Mable Pacific Coast Aggregates, Inc. Yuba River Sand Co.	a a, b a a a	Marysville 501 11th St., Marysville 715 D St., Marysville 85 2d St., San Francisco Marysville	Marysville Marysville Marysville Marysville

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag and volcanic cinder. f. Tube-mill pebbles. g. Decomposed granite.

SULPHUR

Operator	Address	Location of mine
<i>Inyo County</i> Delaware Sulphur Mines, Grover Kihorny.....	2131 Bonita Dr., Glendale.....	Zarich

TUNGSTEN

Operator	Address	Location of mine
<i>Kern County</i> El Diablo Mining Co., H. O. Johanson.....	Kernville.....	Kernville
<i>San Bernardino County</i> Atolia Mining Co..... Atolia-Rand Placers, Inc.....	Crocker Bldg., San Francisco..... 215 W. 5th St., Los Angeles.....	Randsburg Atolia

ZINC

Mine	Operator	Address	Location of mine
<i>Inyo County</i> Estelle & Cerro Gordo..... Estelle & Cerro Gordo..... Leary.....	Estelle Mines Corp..... Silver Lead Syndicate..... F. R. Long, Inc.....	972 S. 4th St., Los Angeles..... 502 Scott Bldg., Salt Lake City, Utah..... Richfield Bldg., Los Angeles.....	Keeler Keeler Keeler
<i>Orange County</i> Blue Light.....	Hughes Mitchell Processes Co.....	Box 147, Torrance.....	Silverado

APPENDIX

MINING BUREAU ACT

Chap. 670 [Stats. 1913]; amended, Chap. 280 [Stats. 1929]; amended, Chap. 748 [Stats. 1933].

An act establishing a state mining bureau, creating the office of state mineralogist, fixing his salary and prescribing his powers and duties; providing for the employment of officers and employees of said bureau, making it the duty of persons in charge of mines, mining operations and quarries to make certain reports, providing for the investigation of mining operations, dealings and transactions and the prosecution for defrauding, swindling and cheating therein, creating a state mining bureau fund for the purpose of carrying out the provisions of this act and repealing an act entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, who shall have the direction, management and control of said state mining bureau, and to provide for the appointment, duties, and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, and all acts amendatory thereof and supplemental thereto or in conflict herewith.

[Approved June 16, 1913. In effect August 10, 1913.]

[Amendment (Sec. 16) approved May 14, 1929. In effect August 14, 1929.]

[Amendment (Sec. 10) approved June 5, 1933. In effect August 21, 1933.]

The people of the State of California do enact as follows:

SECTION 1. There is hereby created and established a state mining bureau. The chief officer of such bureau shall be the state mineralogist, which office is hereby created.

SEC. 2. It shall be the duty of the governor of the State of California and he is hereby empowered to appoint a citizen and resident of this state, having a practical and scientific knowledge of mining, to the office of state mineralogist. Said state mineralogist shall hold his office at the pleasure of the governor. He shall be a civil executive officer. He shall take and subscribe the same oath of office as other state officers. He shall receive for his services a salary of three hundred dollars (\$300) per month, to be paid at the same time and in the same manner as the salaries of other state officers. He shall also receive his necessary traveling expenses when traveling on the business of his office. He shall give bond for the faithful performance of his duties in the sum of ten thousand dollars (\$10,000), said bond to be approved by the governor of the State of California.

SEC. 3. Said state mineralogist shall employ competent geologists, field assistants, qualified specialists and office employees when necessary in the execution of his plans and operations of the bureau, and fix their compensation. The said employees shall be allowed their necessary traveling expenses when traveling on the business of said department and shall hold office at the pleasure of said state mineralogist.

SEC. 4. It shall be the duty of said state mineralogist to make, facilitate, and encourage, special studies of the mineral resources and mineral industries of the state. It shall be his duty: to collect statistics concerning the occurrence and production of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make a collection of typical geological and mineralogical specimens, especially those of economic and commercial importance, such collection constituting the museum of the state mining bureau; to provide a library of books, reports, drawings, bearing upon the mineral industries, and sciences of mineralogy and geology, and arts of mining and metallurgy, such library constituting the library of the state mining bureau; to make a collection of models, drawings and descriptions of the mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections

and library as to make them available for reference and examination, and open to public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of this state, to consist of such collections and library, and to arrange, classify, catalogue, and index the data therein contained, in a manner to make the information available to those desiring it; to issue from time to time such bulletins as he may deem advisable concerning the statistics and technology of the mineral industries of this state.

SEC. 5. It is hereby made the duty of the owner, lessor, lessee, agent, manager or other person in charge of each and every mine, of whatever kind or character, within the state, to forward to the state mineralogist, upon his request, at his office not later than the thirty-first day of March, in each year, a detailed report upon forms which will be furnished showing the character of the mine, the number of men then employed, the method of working such mine and the general condition thereof, the total mineral production for the past year, and such owner, lessor, lessee, agent, manager or other person in charge of any mine within the state must furnish whatever information relative to such mine as the state mineralogist may from time to time require for the proper discharge of his official duties. Any owner, lessor, lessee, agent, manager or other person in charge of each and every mine of whatever kind or character within the state, who fails to comply with the above provisions shall be deemed guilty of a misdemeanor.*

SEC. 6. The state mineralogist now performing the duties of the office of state mineralogist shall perform the duties of the office of state mineralogist as in this act provided until the appointment and qualification of his successor as in this act provided.

SEC. 7. The said state mineralogist shall take possession, charge and control of the offices now occupied and used by the board of trustees and state mineralogist and the museum, library and laboratory of the mining bureau located in San Francisco as provided for by a certain act of the legislature approved March 23, 1893, and hereafter referred to in section fourteen hereof, and shall maintain such offices, museum, library and laboratory for the purposes provided in this act.

SEC. 8. Said state mineralogist or qualified assistant shall have full power and authority at any time to enter or examine any and all mines, quarries, wells, mills, reduction works, refining works and other mineral properties or working plants in this state in order to gather data to comply with the provisions of this act.

SEC. 9. The state mineralogist shall make a biennial report to the governor on or before the fifteenth day of September next preceding the regular session of the legislature.

SEC. 10. All moneys received by the State Mining Bureau (or State Division of Mines) or any officer thereof, from sales of publications issued by said bureau, shall be deposited at least once each month in the State treasury to the credit of a fund which is hereby created and designated "Division of mines revolving printing fund." Said fund shall be used and is hereby appropriated for the use of said bureau in addition to such other funds as may be from time to time appropriated by the Legislature, for the printing and publishing of reports, bulletins, and maps issued by the said bureau. The State Controller is authorized to require financial reports from the State Mining Bureau or any officer thereof.

SEC. 11. The said state mineralogist is hereby authorized and empowered to receive on behalf of this state, for the use and benefit of the state mining bureau, gifts, bequests, devises and legacies of real or other property and to use the same in accordance with the wishes of the donors, and if no instructions are given by said donors, to manage, use, and dispose of the gifts and bequests and legacies for the best interests of said state mining bureau and in such manner as he may deem proper.

SEC. 12. The state mineralogist may, whenever he deems it advisable, prepare a special collection of ores and minerals of California to be sent to or used at any world's fair or exposition in order to display the mineral wealth of the state.

SEC. 13. The state mineralogist is hereby empowered to fix a price upon and to dispose of to the public, at such price, any and all publications of the state mining bureau, including reports, bulletins, maps, registers or other publications, such price shall approximate the cost of publication and distribution. Any and all sums derived from such disposition, or from gifts or bequests made, as hereinbefore pro-

* Sec. 19 of the Penal Code of California provides: "Except in cases where a different punishment is prescribed by this code, every offense declared to be a misdemeanor is punishable by imprisonment in a county jail not exceeding six months, or by a fine not exceeding five hundred dollars, or by both."

vided, must be accounted for by said state mineralogist and turned over to the state treasurer to be credited to the mining bureau fund as provided for in section ten. He is also empowered to furnish without cost to public libraries the publications of the bureau and to exchange publications with other geological surveys and scientific societies, etc.

SEC. 14. The state mineralogist provided for by this act shall be the successor in interest of the board of trustees of the state mining bureau, and the state mineralogist, under and by virtue of that certain act, entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, who shall have the direction, management, and control of said state mining bureau, and to provide for the appointment, duties, and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, and all books, papers, documents, personal property, records, and property of every kind and description obtained or possessed, or held or controlled by the said board of trustees of the said state mining bureau, and the state mineralogist, and the clerks and employees thereof, under the provisions of said act of March 23, 1893, or any act supplemental thereto or amendatory thereof, shall immediately be turned over and delivered to the said state mineralogist herein provided for, who shall have charge and control thereof.

SEC. 15. That certain act entitled, "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, and to provide for the appointment, duties and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction, and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, together with all acts amendatory thereof and supplemental thereto and all acts in conflict herewith are hereby repealed.

SEC. 16. For the purpose of this act and as used herein the term "mine" is hereby defined to embrace and include all mineral bearing properties of whatever kind or character whether underground, quarry, pit, well, spring or other source from which any mineral substance is or may be obtained, and the term "mineral" for the purposes of this act and whenever so used shall embrace and include any and all mineral products both metallic and nonmetallic, solid, liquid or gaseous, and mineral waters of whatever kind or character.

DEPARTMENT OF NATURAL RESOURCES ACT

Chap. 128 [Stats. 1927] ; amended, Chap. 307 [Stats. 1929.]

An act to add a new article to chapter three of title one of part three of the Political Code to be numbered article two j, embracing sections three hundred seventy-three to three hundred seventy-three i, relating to a department of natural resources.

[Approved by the Governor April 13, 1927.]

[Amendment approved May 18, 1929.]

The people of the State of California do enact as follows:

SECTION 1. The Political Code is hereby amended by adding a new article to chapter III of title I of part III thereof, to be numbered article IIj, embracing sections 373 to 373i and to read as follows:

ARTICLE IIj.

DEPARTMENT OF NATURAL RESOURCES

373. A department of the government of the State of California to be known as the department of natural resources is hereby created. The department shall be conducted under the control of an executive officer to be known as the director of natural resources, which office is hereby created. The director shall be appointed by and hold office at the pleasure of the governor and shall receive a salary of six thousand dollars per annum.

Except as in this article otherwise provided, the provisions of article II of this chapter, title, and part of the Political Code as adopted at the forty-fourth session of the Legislature and as the same may be amended from time to time, shall govern and apply to the conduct of the department of natural resources in every respect the same as if such provisions were herein set forth at length and wherever in said article II the term "head of the department" or similar designation occurs, the same shall for the purposes of this article mean the director of natural resources.

373a. For purposes of administration the department shall be forthwith organized by the director thereof, subject to the approval of the governor, in such manner as he shall deem necessary to properly segregate and conduct the work of the department, and the director shall have power to appoint, in accordance with the civil service and other provisions of law, such deputies, officers and other expert and clerical assistants as may be necessary. The work of the department is hereby divided into at least four divisions to be known as the division of forestry, the division of parks, the division of fish and game, and the division of mines.

373b. The division of mines shall be administered through a chief who shall be appointed by the director of natural resources upon the nomination of the state mining board, the chief to be a technically trained mining engineer and to be known as the state mineralogist; such chief shall receive a salary of six thousand dollars per annum. General policies for the guidance of the division of mines shall be determined by a board to be known as the state mining board, which shall consist of five members appointed by and to hold office at the pleasure of the governor.

373c. The division of forestry shall be administered through a chief of division who shall be known as the state forester, who shall be a technically trained forester, appointed by the director of natural resources upon nomination by the state board of forestry hereinafter provided. General policies for the guidance of the division of forestry shall be determined by a state board of forestry which shall consist of seven members appointed by and holding office at the pleasure of the governor. Of the seven members one shall be familiar with the pine timber industry, one with the redwood industry, one with the live stock industry, one with general agriculture and one with the problems of water conservation.

373d. The division of parks shall be administered through a chief of division who shall be appointed by the director of natural resources upon nomination by the

state park commission hereinafter provided. General policies for the administration of the state park system shall be determined by the state park commission which is hereby created to consist of five members appointed by the governor and holding office at his pleasure.

373e. The division of fish and game shall be administered through a fish and game commission consisting of three members appointed by and holding office at the pleasure of the governor.

373f. The chiefs of the divisions of forestry and parks respectively shall receive such salaries as may be determined by the director with the approval of the governor. The director of natural resources and the chief of each division before entering upon his duties shall execute to the State of California an official bond in the penal sum of twenty-five thousand dollars conditioned upon the faithful performance of his duties. The members of the board of forestry, the state parks commission and fish and game commission shall serve without compensation, but shall be entitled to their actual expenses incurred in the performance of their duties.

373g. The department of natural resources shall succeed to and is hereby invested with all the duties, powers, purposes, responsibilities and jurisdiction of the state mining bureau, state mineralogist, department of petroleum and gas, state oil and gas supervisor, state forester, state board of forestry, California redwood park commission, San Pasqual battlefield commission, Mount Diablo park commission, state fish and game commission, state fish and game commissioners, and, except as herein otherwise provided, of the several officers, deputies and employees of such bodies and offices, and whenever by the provisions of any statute or law now in force or that may hereafter be enacted a duty or jurisdiction is imposed or authority conferred upon any of said officers, offices, bodies, deputies or employees by any statute the enforcement of which is transferred to the department, such duty, jurisdiction and authority are hereby imposed upon and transferred to the department of natural resources and the appropriate officers thereof with the same force and effect as though the title of said department of natural resources had been specifically set forth and named therein in lieu of the name of any such body, office, officer, deputy or employee. Said bodies and offices, the duties, powers, purposes, responsibilities and jurisdiction of which are so transferred and vested in the department of natural resources, and the positions of all officers, deputies and employees thereunder, are and each of them is hereby abolished and shall have no further legal existence, but the statutes and laws under which they existed and all laws prescribing their duties, powers, purposes, responsibilities and jurisdiction, together with all lawful rules and regulations established thereunder are hereby expressly continued in force.

The department of natural resources shall be in possession and control of all records, books, papers, offices, equipment, supplies, moneys, funds, appropriations, land and other property real or personal now or hereafter held for the benefit or use of said bodies, offices and officers.

The boards of district oil and gas commissioners, the offices of district oil and gas commissioners and the board of review, correction and equalization created by the act approved June 10, 1915, establishing the department of petroleum and gas, are hereby respectively continued in force with the powers, duties, responsibilities and jurisdiction in them vested by the provisions of said act approved June 10, 1915, as amended; *provided*, that said board of review shall consist of the director of natural resources, the director of finance and the chairman of the state board of equalization.

373h. The management and control of the property acquired by the State of California under or pursuant to the provisions of the act entitled "An act to accept the gift to the state of San Pasqual battlefield in San Diego county, to provide for collecting and systematizing the history of said battle, for determining the exact location thereof, and to report a suitable method of marking said battlefield and commemorating the heroism of those Americans who fought and died there," approved May 11, 1919, is hereby transferred to and vested in the department of natural resources.

373i. From and after the date upon which this act takes effect, the department of natural resources shall be and is hereby authorized and empowered to expend the moneys in any appropriation or in special fund in the state treasury now remaining or made available by law for the administration of the provisions of all the statutes the administration of which is committed to the department, or for the use, support, or maintenance of any board, bureau, commission, department,

office or officer whose duties, powers, and functions are, by the provisions of this article, transferred to and conferred upon the department of natural resources. Such expenditures by the department shall be made in accordance with law in carrying out the purposes for which such appropriations were made or such special funds created.

PUBLICATIONS OF THE DIVISION OF MINES

During the past fifty-four years, in carrying out the provisions of the organic act creating the former California State Mining Bureau, there have been published many reports, bulletins and maps which go to make up a library of detailed information on the mineral industry of the State, a large part of which could not be duplicated from any other source.

One feature that has added to the popularity of the publications is that many of them have been distributed without cost to the public, and even the more elaborate ones have been sold at a price which barely covers the cost of printing.

Owing to the fact that funds for the advancing of the work of this department have usually been limited, the reports and bulletins mentioned are printed in limited editions many of which are now entirely exhausted.

Copies of such publications are available, however, in the offices of the Division of Mines, in the Ferry Building, San Francisco; State Building, Los Angeles; State Office Building, Sacramento; Redding; and Division of Oil and Gas at Santa Barbara, Santa Paula, Coalinga, Taft, Bakersfield. They may also be found in many public, private and technical libraries in California and other states and foreign countries.

A catalog of all publications from 1880 to 1917, giving a synopsis of their contents, is issued as Bulletin No. 77.

Publications in stock may be obtained by addressing any of the above offices and enclosing the requisite amount in the case of publications that have a list price. Only coin, stamps or money orders should be sent, and it will be appreciated if remittance is made in this manner rather than by personal check.

Money orders should be made payable to the Division of Mines.

NOTE.—The Division of Mines frequently receives requests for some of the early Reports and Bulletins now out of print, and it will be appreciated if parties having such publications and wishing to dispose of them will advise this office.

REPORTS

Asterisks (**) indicate the publication is out of print.

	Price Postpaid
**First Annual Report of the State Mineralogist, 1880, 43 pp. Henry G. Hanks -----	-----
**Second Annual Report of the State Mineralogist, 1882, 514 pp., 4 illustrations, 1 map. Henry G. Hanks-----	-----
**Third Annual Report of the State Mineralogist, 1883, 111 pp., 21 illustrations. Henry G. Hanks-----	-----
**Fourth Annual Report of the State Mineralogist, 1884, 410 pp., 7 illustrations. Henry G. Hanks-----	-----
**Fifth Annual Report of the State Mineralogist, 1885, 234 pp., 15 illustrations, 1 geological map. Henry G. Hanks-----	-----
Sixth Annual Report of the State Mineralogist, Part I, 1886, 145 pp., 3 illustrations, 1 map. Henry G. Hanks-----	\$0.70
Part II, 1887, 222 pp., 36 illustrations. William Irelan, Jr.-----	.70
**Seventh Annual Report of the State Mineralogist, 1887, 315 pp. William Irelan, Jr. -----	-----
**Eighth Annual Report of the State Mineralogist, 1888, 948 pp., 122 illustrations. William Irelan, Jr.-----	-----
Ninth Annual Report of the State Mineralogist, 1889, 352 pp., 57 illustrations, 2 maps. William Irelan, Jr.-----	1.15
**Tenth Annual Report of the State Mineralogist, 1890, 983 pp., 179 illustrations, 10 maps. William Irelan, Jr.-----	-----
Eleventh Report (First Biennial) of the State Mineralogist, for the two years ending September 15, 1892, 612 pp., 73 illustrations, 4 maps. William Irelan, Jr.-----	1.25
**Twelfth Report (Second Biennial) of the State Mineralogist, for the two years ending September 15, 1894, 541 pp., 101 illustrations, 5 maps. J. J. Crawford-----	-----
**Thirteenth Report (Third Biennial) of the State Mineralogist, for the two years ending September 15, 1896, 726 pp., 93 illustrations, 1 map. J. J. Crawford-----	-----
Chapters of the State Mineralogist's Report, Biennial Period, 1913-1914, Fletcher Hamilton:	
Mines and Mineral Resources, Amador, Calaveras and Tuolumne Counties, 172 pp., paper -----	.60
Mines and Mineral Resources, Colusa, Glenn, Lake, Marin, Napa, Solano, Sonoma and Yolo Counties, 208 pp., paper-----	.60
Mines and Mineral Resources, Del Norte, Humboldt and Mendocino Counties, 59 pp., paper-----	.35
**Mines and Mineral Resources, Fresno, Kern, Kings, Madera, Mariposa, Merced, San Joaquin and Stanislaus Counties, 220 pp., paper-----	-----
Mines and Mineral Resources of Imperial and San Diego Counties, 113 pp., paper -----	.50
Mines and Mineral Resources, Shasta, Siskiyou and Trinity Counties, 180 pp., paper-----	.60
Fourteenth Report of the State Mineralogist, for the Biennial Period 1913-1914, Fletcher Hamilton, 1915:	
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Samples (limited to two at one time) of any mineral found in the State may be sent to the Division of Mines for identification, and the same will be classified free of charge. No samples will be determined if received from points outside the State. It must be understood that no assays, or quantitative determinations will be made. Samples should be in lump form if possible, and marked plainly with name of sender on outside of package, etc. No samples will be received unless delivery charges are prepaid. A letter should accompany sample, giving locality where mineral was found and the nature of the information desired.

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